

348.025 Illinois
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Code

Title 32:
Energy



TITLE 32: ENERGY
CHAPTER I: DEPARTMENT OF ENERGY AND
NATURAL RESOURCES

PART 100
ADMINISTRATION OF THE ILLINOIS COAL
AND ENERGY DEVELOPMENT BOND ACT

Section

100.10	Authority
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100.50	State Funding
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AUTHORITY: Implementing Section 1 of the Illinois Coal and Energy Development Bond Act (Ill. Rev. Stat. 1981, ch. 96 1/2, pars. 4101 et seq.) and authorized by Section 1(d) of "An Act in relation to natural resources, research, data collection and environmental studies" (Ill. Rev. Stat. 1981, ch. 96 1/2, par. 7401(d)).

SOURCE: Adopted December 30, 1977; transferred to the Institute of Natural Resources by P.A. 80-1218, effective July 14, 1978; Institute of Natural Resources redesignated the Department of Energy and Natural Resources by P.A. 82-592, effective September 23, 1981; codified at 8 Ill. Reg. 8448.

Section 100.10 Authority

The Department of Energy and Natural Resources, having been created pursuant to "An Act in relation to natural resources, research, data collection and environmental studies" (Ill. Rev. Stat. 1981, ch. 96 1/2, par. 7401(d)), has been designated by the General Assembly to exercise certain powers and perform certain duties in accordance with the Illinois Coal and Energy Development Bond Act (Ill. Rev. Stat. 1981, ch. 96 1/2, pars. 4101 et seq.).

Section 100.20 Definitions

"Act" means "An Act to provide for the financing of a State program for research, development and demonstration in coal and energy; to authorize the issuance and sale of general obligation bonds of the State of Illinois; and to provide for the payment of the principal of and interest on such bonds," which Act is otherwise known as the Illinois Coal and Energy Development Bond Act.

"Agreement" means a signed and written document which defines and describes the rights and obligations of the Contractor and the Department in respect to a Project for the Development of Coal and Other Energy Resources.

"Application" means that written document submitted by an applicant for State Funding which conforms to the form and content of Section 100.30 hereof.

"Bonds" mean the general obligation bonds of the State of Illinois which are authorized to be issued, sold and retired in accordance with the manner set forth in the Act, the aggregate principal amount of which is \$70,000,000.

"Coal" or "Coal Resources" means coal, coal products or by-products, including electricity, synthetic fuels, gas and liquefaction.

The "Commission" means the Illinois Energy Resources Commission which is established pursuant to "An Act creating the Illinois Energy Resources Commission and defining its powers and duties" (Ill. Rev. Stat. 1981, ch. 96 1/2, par. 101).

"Contractor" means any business, industrial, university, governmental or other qualified individuals or organizations with whom the Department enters into an Agreement to promote Development of Coal and Other Energy Resources.

"Department" means the Department of Energy and Natural Resources of the State of Illinois.

"Development of Coal and Other Energy Resources" means research, development and demonstration of improved methods of discovery, production, transportation, sale, distribution, conversion, end-use and waste disposal of Coal and Other Energy Resources.

"Director" means the Director of the Department.

"Eligible Project" means that Project for which previous approval of the Commission has been granted and for which funds are authorized to be expended pursuant to the purposes specified in the Act (Ill. Rev. Stat. 1981, ch. 96 1/2, par. 4103), which purposes include, but are not limited to, the following:

"the commercial application of existing technology for development of coal resources, to initiate or complete development of new technology for development of coal resources, and for planning, design, acquisition, development, construction, improvement and financing a site or sites and facilities for establishing plants, projects or demonstrations for development of coal resources, and research and development of other forms of energy."

"Other Forms of Energy" means solar energy, geothermal, wind generation, solid waste or any other energy system except that which is generated by nuclear energy.

"Other Funding" is that amount which shall be paid by the Contractor(s) or other Project participants and which, when added to State Funding, shall equal the Total Project Cost.

"Project" means the proposal of work to be done as described in the Application.

"State Funding" is that portion of Total Project Cost which the Department shall pay to the Contractor(s), the amount of which has received prior approval of the Commission.

"Total Project Cost" means all necessary and reasonable costs related to the completion of the Project, but does not include administrative, travel or promotional costs incurred by the Contractor or other Project participants prior to the execution of an Agreement.

Section 100.30 Application

- a) The Application shall be in writing and consist of one (1) original and five (5) copies which shall be submitted to the Director of the Department of Energy and Natural Resources, 325 West Adams Street, Room 300, Springfield, Illinois 62706.

- b) Except as provided in subsection (c) hereof, each Application shall contain categories of information which shall include, but are not limited to, the following:

- 1) Technical Proposal
 - A) Table of Contents
 - B) Synopsis of Proposal
 - C) Project Objectives
 - D) Project Schedule by Task
 - E) Site and Facility Location
 - F) Process Selection and Design
 - G) Technical Feasibility of Project
 - H) Engineering, Procurement, Construction and Operation
 - I) Product Testing
 - J) Environmental Feasibility
 - K) Socio-Economic Impact
 - L) Future Use of Project Results and Facility
 - M) Other Relevant Information
- 2) Business Proposal
 - A) Table of Contents
 - B) Summary of Total Project Costs
 - C) Cost-Sharing Formula including Form and Amount of Other Funding
 - D) Summary of Estimated Costs by Cost Element
 - E) Basis of Cost Estimate
 - F) Schedule of Payments for Total Project Costs
 - G) Economic Feasibility of Project
 - H) Management Plan and Experience
 - I) Previous Work in Project Area
 - J) Key Personnel and Resources
 - K) Financial Statement(s) of Applicant
 - L) Justification of State of Illinois Project Involvement
 - M) Other Relevant Information

- c) If the Applicant determines that any of the Application contents, as described in subsection (b), are irrelevant or not applicable to the proposed Project, the Applicant shall fully explain reasons for that conclusion.
- d) The Department may, in its discretion, request the Applicant to furnish information in addition to that which is otherwise required in this Section in order to conduct a proper review.

Section 100.40 Department Review Procedures

- a) The Application shall be reviewed by the Department and the Director may, in his discretion, obtain the assistance of other persons and entities either within or outside State government to assist in this review procedure. Such assistance may include professional consultants, such as accountants, architects, attorneys, engineers, planners, etc., applying ordinary professional standards to such review to the extent the Department, pursuant to its administrative abilities, is lacking professional and technical services required to assess feasibility, adequacy, sufficiency and other relevant factors contained in the Application.
- b) The time required by the Department to conduct its review of the Application will be determined by some or all of the following factors:
 - 1) the scope and complexity of the proposed Project;
 - 2) the number of other Applications under concurrent review by the Department;
 - 3) the availability of staff and administrative finances of the Department; and
 - 4) the sufficiency and accuracy of the Application.

- c) Subsequent to review by the Department, the applicant shall be notified of the conclusion of the Department's evaluation.

Section 100.50 State Funding

- a) The Department allocates State Funding pursuant to statutory language of the Act, which provides that:

"The State of Illinois is authorized to issue, sell and provide for the retirement of general obligation bonds of the State of Illinois in the amount of \$70,000,000, hereinafter called "Bonds," \$65,000,000 of which shall be for the specific purposes of acquisition, development, construction, reconstruction, improvement, financing, architectural and technical planning and installation of capital facilities consisting of buildings, structures, durable equipment, and land for the purpose of capital development of coal resources, and \$5,000,000 of which shall be for research and development of other forms of energy."
- b) The Department has the power to recommend an amount of State Funding for a proposed Project to the Commission which amount and which proposed Project must be approved or rejected by the Commission within 45 days of the receipt of the proposal by the Commission.
- c) The Department shall exercise its power to recommend an amount of State Funding to the Commission for its approval after
 - 1) making a determination that the Project is a qualifying Project pursuant to Section 100.40 hereof, and
 - 2) consideration of factors which include, but are not limited to, the following:
 - A) the market potential for the increased use of Illinois Coal, Coal Resources or Other Forms of Energy;
 - B) the transferability of the proposed Project results to commercial applications capable of utilizing Illinois Coal, Coal Resources or Other Forms of Energy;
 - C) the potential profit or proprietary benefits which will be derived from the Project by the Contractor and other Project participants, if any;
 - D) the ability of the Contractor or other Project participants to obtain funding from sources other than the State of Illinois;
 - E) the amount of State Funding in relation to the amount of Total Project Cost and the amount of other Funding; and
 - F) the other anticipated direct and indirect benefits of the Project to the State of Illinois.

Section 100.60 Agreement

Subsequent to Commission determination of an Eligible Project, the Department and the Contractor(s) shall commence to enter into an Agreement, the terms and conditions of which are subject to negotiation between the partners.

TITLE 32: ENERGY
CHAPTER I: DEPARTMENT OF ENERGY AND
NATURAL RESOURCES

PART 110
ADMINISTRATION OF THE ILLINOIS
INDUSTRIAL COAL UTILIZATION PROGRAM

Section

- 110.10 Purpose and Scope
- 110.20 Definitions
- 110.30 Solicitation of Industrial Coal Projects
- 110.40 Application
- 110.50 Application Review Procedures
- 110.60 Determination by the Illinois Coal Development Board
- 110.70 State Financing
- 110.80 Loan Agreement
- 110.90 Repayment of State Financing

AUTHORITY: Implementing and authorized by the Build Illinois Bond Act (P.A. 84-111 effective July 25, 1985 as amended by P.A. 84-1070, effective November 27, 1985).

SOURCE: Adopted at 10 Ill. Reg. 5576, effective March 31, 1986.

Section 110.10 Purpose and Scope

- a) *The purpose of the Illinois Industrial Coal Utilization Program is to increase the environmentally sound use of Illinois Coal by Illinois manufacturers and industries.* (Section 9 of the Build Illinois Bond Act as amended by P.A. 84-1070, effective November 27, 1985, hereafter sometimes referred to as "the Act").
- b) The Department is authorized to use monies deposited in the Illinois Industrial Coal Utilization Fund, the Build Illinois Purposes Fund or the Build Illinois Bond Fund, subject to appropriation, and to accept guarantees from individuals, partnerships, joint ventures, corporations and governmental agencies for the purpose of implementing a revolving loan program to partially finance new coal burning facilities or conversion of existing facilities to Illinois Coal use.
- c) The Department, subject to the approval of the Illinois Coal Development Board, is authorized to make below market rate loans available for Industrial Coal Projects. Any loan or series of loans shall be limited to an amount not to exceed the lesser of \$2,500,000 or 25% of the Total Project Cost.

Section 110.20 Definitions

"Act" means the Build Illinois Bond Act, as may be amended from time to time. (P.A. 84-111, effective July 25, 1985 as amended by P.A. 84-1070 effective November 27, 1985).

"Additional Financing" is the amount of financing needed from other sources which when added to State Financing shall equal the Total Project Cost as stated on the loan application.

"Applicant" means any manufacturer or industry doing business in Illinois who has submitted a written application to the Department for participation in the Illinois Industrial Coal Utilization Program.

"Board" means the Illinois Coal Development Board.

"Borrower" is an Applicant whose application for State Financing has been approved by the Board.

"Department" means the Department of Energy and Natural Resources of the State of Illinois.

"Director" means the Director of the Department of Energy and Natural Resources of the State of Illinois.

"Financial Advisory Committee" is a seven member committee appointed by the Director which shall advise the Department on the financial status of the application. Six members shall be representatives from the Illinois financial community and one member shall be a representative from the Department.

"Illinois Coal" means coal mined in Illinois.

"Industrial Coal Project", hereinafter sometimes referred to as "Project", means any new environmentally sound coal burning facility sited in Illinois or conversion of existing facility located in Illinois to coal use, in an environmentally sound manner.

"Program" means the Illinois Industrial Coal Utilization Program.

"State Financing" is that portion of Total Project Cost which the Department shall loan to the Borrower, the amount and terms of which have received prior approval of the Board.

"Total Project Cost" means only those estimated capital costs that include expenditures for the planning, engineering, acquisition, construction, improvement and conversion of facilities and equipment which will foster the environmentally sound use of Illinois Coal related to the completion of the Industrial Coal Project as shown on the loan application, but does not include corporate administrative, travel, or promotional costs incurred by the Applicant or other Project participants.

Section 110.30 Solicitation of Industrial Coal Projects

- a) The Department will issue solicitation(s) for applications to the Program when moneys are available. Notice of the solicitation for applications shall be published in the official State newspaper and otherwise publicized through press releases, contacting interested parties on the Department's mailing list(s), trade publications, and through other appropriate channels.
- b) Applicants shall have forty-five (45) days from the date of announcement of the solicitation to submit their applications to the Department.
- c) Notwithstanding Section 110.30(a) of this Part, the Department will accept unsolicited applications for funding under the Program and shall review such applications according to the same guidelines stated in this Part. Consideration of unsolicited applications shall be made on a first-come first-serve basis, subject to the availability of funds to the Department for the Program.

Section 110.40 Application

- a) The application shall be in writing and consist of one (1) original and five(5) copies which shall be submitted to: Manager, Illinois Industrial Coal Utilization Program,

Illinois Department of Energy and Natural Resources, 325 W. Adams, Room 300, Springfield, IL 62704.

- b) Except as provided in subsection (4) below, each application shall contain categories of information which shall include, but are not limited to, the following:

- 1) Summary of Proposed Project
 - A) General description of the Industrial Coal Project.
 - B) General description of the Applicant including a history of the Applicant's present business, number of employees, days and hours of operation, products, etc., for which the Industrial Coal Project is to be established.
 - C) Curriculum vitae of the Applicant's project manager, and managers of the Project's engineering, construction and operation.
 - D) General description of the Project site.
 - E) Such plans, equipment lists or other documents which contribute to an understanding of the type, structure and general character of the Project.
 - F) Preliminary engineering and cost estimates for the development, construction or acquisition of new facilities or the modification of existing facilities to be accomplished in the Industrial Coal Project.
 - G) Estimated Total Project Cost.
 - H) Project schedule.
 - I) General description of the expected use of Illinois Coal resulting from the Project, including estimated annual usage and length of commitment to use Illinois Coal.
 - J) Methods of handling wastes and compliance with existing emission standards.
 - K) Lists of known permits, licenses and other authorizations as required by governmental agencies or others.
 - L) Other relevant information which the Applicant wishes the Department to consider in its review of the application.
- 2) Financial Information
 - A) Certified financial statements for the previous three years.
 - B) Projections and forecasts of the next three years' profit and loss statements.
 - C) Financial statement(s) of Applicant.
 - D) Curriculum vitae of President, Vice President, Secretary and Treasurer of Applicant.
 - E) Proposed financing plan.
 - i) Percentage of Total Project Cost and dollar amount to be provided by State Financing.
 - ii) Percentage of Total Project Cost to be provided by Additional Financing, identified by source and dollar amount, and percentage contribution to the Project.
 - iii) Requested length of term of loan.
 - iv) Certification that the Project would not occur without State Financing.
 - F) Letter of commitment by Applicant to burn Illinois Coal for a specified period of time. The Applicant must commit to the use of Illinois Coal for at least the duration of the loan.
 - G) Financial evaluation(s) of the Applicant and Project completed by the provider(s) of

Additional Financing, excluding any confidential business information.

- H) Letter of commitment from each provider of Additional Financing.
 - I) Statement of value of any property and improvements thereto provided or to be provided for the Project by other sources, prepared by an independent Certified Public Accountant.
 - J) Other relevant information.
- 3) Certification by Applicant that the information provided is accurate.
 - 4) If the Applicant determines that any of the application contents, as described in subsections (1) and (2) are irrelevant or not applicable to the proposed Industrial Coal Project, the Applicant shall fully explain the reasons for that conclusion.

Section 110.50 Application Review Procedures

- a) The Department, with assistance from the Financial Advisory Committee, shall evaluate applications for loans and make such evaluations available to the Board. *Evaluation of the loan applications shall be based on, but not limited to, the following criteria:* (Section 10 of the Act)
 - 1) *The length of time the Applicant will commit to using Illinois Coal in the facility which is modified, acquired or constructed as a result of the Project. The Applicant must agree to use Illinois Coal for at least the life of the loan as a condition of such loan.* (Section 10 of the Act)
 - 2) *The total amount of Illinois Coal used.* (Section 10 of the Act)
 - 3) *The financial feasibility of the Project, the percentage of the Total Project Cost for which State Financing is requested, and the extent to which the Project maximizes the use of private funds or funds from other public sources. To be financially feasible the Project must have a positive net present value and an internal rate of return equal to or greater than the cost of capital.* (Section 10 of the Act)
 - 4) *The technical merits of the Project, including but not limited to the effectiveness of the proposed coal-use system in controlling emissions of sulfur dioxide and other pollutants. The Project's technology must be commercially proven and commercially available.* (Section 10 of the Act)
 - 5) *The environmental acceptability of the Industrial Coal Project, including the percentage reductions of sulfur dioxide, nitrous oxides and other pollutants. The Industrial Coal Project must comply with all applicable environmental regulations.*
 - 6) *The type and quantity of fuel displaced by the Industrial Coal Project.*
 - 7) *The amount of additional loan security provided by the Applicant to the Department, if any.*
- b) Following its evaluation of the application, the Department shall make a recommendation to the Board regarding the advisability of providing State Financing for the proposed Industrial Coal Project. The Department shall rank the proposals on the above criteria and recommend for funding to the Board the Projects with the lowest cumulative scores.
- c) The Department shall use its best efforts to complete the evaluation of applications received and to make its recommendation to the Board in a timely manner.

Section 110.60 Determination by the Illinois Coal Development Board

used for the purposes of the Program, subject to appropriation.

- a) The Board shall review the recommendations of the Department and shall have final authority for the approval of State Financing for any Industrial Coal Project. In making its determination, the Board shall consider the recommendations of the Department and its Financial Advisory Committee, and shall utilize the evaluation criteria set forth in Section 110.50 of these rules.
- b) The Applicant shall be promptly notified in writing of the Board's determination.

Section 110.70 State Financing

- a) The Department allocates State Financing pursuant to the statutory language of the Act, which provides that:
"The Department subject to the approval of the Illinois Coal Development Board shall make below market rate loans available to fund a portion of each qualifying Industrial Coal Project." (Section 9 of the Act)
- b) The interest rate for State Financing shall be fixed for the period of the loan and shall not exceed 5% per year. The Department shall annually set the interest rate for all loans that will be issued during the next twelve months based upon the following considerations:
 - 1) current economic conditions;
 - 2) leading interest rate indicators;
 - 3) ability of the State to maximize financial returns to the Illinois Industrial Coal Utilization Fund;
 - 4) potential to sustain the Program through loan repayments;
 - 5) projected availability of other State funds for the Program; and
 - 6) ability of the State to obtain a sufficient number of Applicants for the Program.
- c) The period of the loan shall be the term requested by the Applicant, but in any event shall be at least seven years but no longer than ten years.
- d) *Any loan or series of loans shall be limited to an amount not to exceed the lesser of \$2,500,000 or 25% of the Total Project Cost.* (Section 9 of the Act)

Section 110.80 Loan Agreement

After an Industrial Coal Project has been approved by the Board, the Department and the Borrower shall execute a loan agreement. The loan agreement shall, at a minimum, require a letter of certification from the Borrower's fiscal officer or accountant stating that State Financing shall be applied only to the Industrial Coal Project, as described in the application and approved by the Board. The agreement shall include a statement signed by the Borrower certifying that it will comply with the terms and conditions of State Financing provided in connection with the Project and the Program. The loan agreement may specify *actions necessary or appropriate to protect the State's interest in the event of default, foreclosure or noncompliance with the terms and conditions of the loan provided under the Program, including the power to sell, dispose, lease or rent, upon terms and conditions deemed to be appropriate by the Department, real or personal property which the Department may receive as a result thereof.* (Section 12 of the Act)

Section 110.90 Repayment of State Financing

- a) The Borrower shall repay State Financing with interest in accordance with the terms and conditions of the agreement between the Borrower and the Department.
- b) Funds repaid to the State under this Program shall be placed in the Illinois Industrial Coal Utilization Fund to be

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER a: ADMINISTRATIVE HEARING
RULES

PART 200
ADMINISTRATIVE HEARINGS

Section	
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200.230	Final Decision of the Director

AUTHORITY: Implementing Sections 8.2, 9 and 11 and authorized by Section 6 of the Radiation Protection Act (Ill. Rev. Stat. 1985, ch. 111 1/2, pars. 218, 219, 221 and 216).

SOURCE: Filed April 20, 1974 by the Department of Public Health; transferred to the Department of Nuclear Safety by P.A. 81-1516, effective December 3, 1980; amended at 7 Ill. Reg. 9306, effective July 22, 1983; codified at 7 Ill. Reg. 16404; amended at 10 Ill. Reg. 17200, effective September 25, 1986.

Section 200.10 Scope and Nature of Rules

- a) Authority and Scope
 - 1) Authority. The rules of this Part are promulgated pursuant to Section 5-10(a) of the Illinois Administrative Procedure Act (IAPA) (Ill. Rev. Stat. 1991, ch. 127, par. 1005-10(a)).
 - 2) Scope. This Part shall govern the proceedings of any adjudicatory administrative hearing the Department of Nuclear Safety (Department), except as otherwise specifically provided by statute or regulation.
- b) Communications to the Department. All communications to the Department concerning administrative hearings shall be addressed to the Director at Springfield, Illinois, unless otherwise directed.
- c) Construction of rules. These rules shall not be construed to abrogate, modify, or limit any rights, privileges, or immunities granted or protected by the Constitution or laws of the United States or the State of Illinois. In case of any conflict between these rules and the IAPA or a

licensing statute, the procedures of the IAPA or licensing statute shall control.

(Source: Amended at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.20 Appearance - Right to Counsel

- a) Any party to a proceeding before the Department may appear as follows:
 - 1) A natural person may appear in his/her own behalf or by an attorney at law licensed and registered to practice in the State of Illinois.
 - 2) Any other person may appear through any bona fide officer, employee, or by an attorney licensed and registered to practice in the State of Illinois.
- b) Each party to a proceeding before the Department shall inform the Department in writing of the name and address to which any notice or other document should be served upon the party to such proceeding.
- c) All persons appearing in proceedings before the Department shall conform to the standards of conduct of attorneys before the courts of the State of Illinois (Ill. Rev. Stat. 1985, ch. 110A, Rule 7-106). If a person fails to conform to these standards, and such failure delays or disrupts the proceeding, the Department or the hearing officer shall have the authority to prohibit such person from appearing in the proceeding.

(Source: Former section 200.20 repealed, new section 200.20 renumbered from former section 200.30 and amended at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.30 Parties

- a) The parties to administrative hearings before the Department are the Department and the Respondent.
- b) A Respondent is a person or entity against whom a Preliminary Order and Notice of Opportunity for Hearing is filed by the Department.
- c) Misnomer of a party is not a ground for dismissal. The name of any party may be corrected at any time.

(Source: Former section 200.30 renumbered to new section 200.20, new section 200.30 renumbered from former section 200.40 and amended at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.40 Form of Papers

- a) Written pleadings, motions or other documents filed in any proceeding shall be typewritten. Copy shall be on one side of the paper and shall be double spaced, except that quotations may be single spaced and indented. Reproductions of any documents to be incorporated into the record may be made by carbon or copying machine or any other process that produces legible black on white copies.
- b) Written pleadings, motions or other documents filed in any proceeding shall be cut or folded to a width of 8 1/2 inches and a length of 11 1/2 inches and shall have inside margins of no less than one inch width.
- c) Written pleadings, motions, or other documents shall be signed in ink with the name and address of the party filing the paper, and, if represented by an attorney, the name and address of such attorney.
- d) Written pleadings, motions, affidavits, and other documents shall be filed in triplicate with the Department

and one copy shall be served on each party to the proceeding.

(Source: Former section 200.40 renumbered to new section 200.30, new section 200.40 adopted at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.50 Notice, Service and Proof of Service

- a) The hearing officer and all parties to the proceedings shall be served all pleadings, motions, notices and other documents filed by any party. Proof of such service on all parties shall be filed with the hearing officer.
- b) Any Order or Notice issued by the Department shall either be served personally or by registered or certified mail on the Respondent.
- c) All other pleadings and other documents shall be served personally or by first class United States mail properly addressed with postage prepaid, to each party to the proceeding.
- d) When any party or parties have appeared by attorney, service upon the attorney shall be deemed service upon the party or parties.
- e) Proof of service of any paper shall be by certificate of attorney, affidavit or acknowledgement, or certified or registered mail return receipt requested.
- f) Wherever notice or notification is indicated or required, it shall be effective upon the date of mailing to the party's business address, residence or last address on file with the Department.
- g) In addition to the methods provided for in this Part, a Respondent may be served in any manner permitted by law. (Ill. Rev. Stat. 1985, ch. 110, pars. 2-201 et seq.)

(Source: Former section 200.50 repealed, new section 200.50 adopted at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.60 Preliminary Order and Notice of Opportunity for Hearing

- a) In the event that a person has violated or is alleged to have violated the statutes, regulations or terms of licensure or accreditation, the Department shall commence administrative proceedings by the service of a Preliminary Order and Notice of Opportunity for Hearing upon the Respondent.
- b) The Preliminary Order and Notice of Opportunity for Hearing shall contain:
 - 1) A statement of the legal authority and jurisdiction under which a hearing would be held;
 - 2) A reference to the provision(s) of the statute(s), regulation(s) or term(s) of licensure or accreditation involved;
 - 3) A short and plain statement of the matters asserted, including dates, location, events, nature, extent, and duration, to advise the Respondent of the extent and nature of the alleged violations;
 - 4) A statement of the right to request a hearing and the date by which a request for a hearing is to be submitted to the Department, which shall be at least ten (10) days from the date of the Preliminary Order;
 - 5) The time, date and location when the hearing will be held, if one is requested; and
 - 6) A statement of the action(s) that will be taken by the Department in the event that a hearing is not requested by the Respondent.

(Source: Former section 200.60 renumbered to new section 200.100, new section 200.60 adopted at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.70 Right to Hearing

- a) In the event that the Respondent seeks a hearing pursuant to matters raised in a Preliminary Order issued in accordance with Section 200.60, the Respondent must submit a request for a hearing by the date specified in the Preliminary Order. In the event that a person seeks a hearing pursuant to the denial of an application for licensure or accreditation or the denial of reinstatement of licensure or accreditation by the Department, the person must submit a request for a hearing within thirty (30) days of such denial.
- b) This request must be in writing and must contain a brief statement of the basis upon which the Department's Preliminary Order or denial of licensure or accreditation is being challenged.
- c) If such request is not submitted by the date required in accordance with subsection (a), or if such request is submitted but later withdrawn, the action(s) proposed by the Department in the Preliminary Order or denial of licensure or accreditation shall be a final and binding administrative determination.
- d) No final decision shall be made or action taken by the Department until the Respondent has had an opportunity to request a hearing and, if requested, a hearing has been held, except that in cases wherein there is an immediate threat to public health or safety, the Department may take action to immediately enjoin such threat pending a hearing. Such hearing shall be held within thirty (30) days of the Department's action (Ill. Rev. Stat. 1985, ch. 111 1/2, par. 222).

(Source: Former section 200.70 renumbered to new section 200.110, new section 200.70 adopted at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.80 Motions

A hearing officer may allow oral motions and responses on emergency or purely procedural questions or for good cause shown. Emergency and procedural motions will be ruled upon when made. Other motions, such as motions to dismiss, etc., will not be ruled upon by the hearing officer but will be considered by the hearing officer in preparation of the written report and will be submitted to the Director for a decision.

(Source: Former section 200.80 repealed, new section 200.80 adopted at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.90 Continuances

A party shall be granted one continuance of up to fourteen (14) days on request. Any other requests for a continuance will be granted only for good cause shown. In determining good cause, factors which the hearing officer may consider shall include the inability to produce a material witness or evidence, surprise, required attendance of legal counsel elsewhere, illness or death of a party or witness, and substitution of an attorney.

(Source: Former section 200.90 renumbered to new section 200.120, new section 200.90 adopted at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.100 Hearing Officer

- a) When a Preliminary Order and Notice of Opportunity for Hearing is issued and a hearing is requested, the Director of the Department shall designate a hearing officer to preside at the formal administrative hearing.
- b) The appointed hearing officer shall not have direct involvement with the case or have an interest in the decision to be reached. Mere familiarity with the facts shall not disqualify a hearing officer.
- c) The hearing officer shall have the duty to conduct a fair hearing, to maintain order, to ensure development of a clear and complete record, and to submit a written report to the Director for the Director's decision.
- d) In addition to other authority provided in this Part, the hearing officer shall have the authority to:
 - 1) Direct the parties to meet in an informal conference in accordance with Section 200.120;
 - 2) Administer oaths;
 - 3) Receive evidence and rule upon the admissibility of oral testimony and other evidence;
 - 4) Examine witnesses for the purpose of clarifying the record;
 - 5) Consider and rule upon motions in accordance with Section 200.80.

(Source: Former section 200.100 repealed, new section 200.100 renumbered from former section 200.60 and amended at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.110 Ex Parte Consultation

Ex parte communications and consultation between and among parties shall be limited to that which is in accordance with the Illinois Administrative Procedure Act, (Ill. Rev. Stat. 1991, ch. 127, par. 1010-60).

(Source: Former section 200.110 renumbered to new section 200.130, new section 200.110 renumbered from former section 200.70 and amended at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.120 Informal Conferences

- a) Upon request of any party or on the hearing officer's own motion, the hearing officer shall have the authority to direct the parties to appear at a specified time and place for a conference, prior to or during the course of the hearing, for the purpose of:
 - 1) simplifying the issues;
 - 2) amending the pleadings for clarification, amplification, or limitation;
 - 3) making admissions of fact or stipulating to the admissibility of evidence;
 - 4) limiting the number of witnesses;
 - 5) exchanging witness lists and prepared testimony and exhibits;
 - 6) aiding in the simplification of the evidence and disposition of the proceedings; or
 - 7) stipulation and settlement concerning matters relating to confidential information, e.g. privileged medical records and commercial trade secrets or financial information the disclosure of which could cause competitive harm.
- b) The record of the hearing shall reflect any orders or other decisions which are made as a result of such a conference.

(Source: Former section 200.120 repealed, new section 200.120 renumbered from former section 200.90 and amended at

10 Ill. Reg. 17200, effective 17200, effective September 25, 1986)

Section 200.130 Conduct of Hearings

- a) Unless closing the hearing is necessary to preserve the confidentiality of medical records, or the confidentiality of trade secrets or financial information the disclosure of which could cause competitive harm, hearings shall be open to the public, as required by Section 8.2 of the Radiation Protection Act (Ill. Rev. Stat. 1985, ch. 111 1/2, par. 218.2). If matters of confidentiality are involved, the hearing officer shall have the authority to close all or a portion of the hearing to the public.
- b) The hearing officer shall direct all parties to enter their appearances on the record. All witnesses shall be sworn.
- c) The hearing officer shall inquire fully into the matters at issue and shall receive testimony of witnesses and any other evidence which is relevant and material to the issues presented. The following shall be the usual order of administrative hearings, unless the hearing officer decides otherwise:
 - 1) presentation, argument, and disposition of preliminary motions in accordance with Section 200.80;
 - 2) presentation of opening statements;
 - 3) Department's case in chief;
 - 4) Respondent's case in chief;
 - 5) Department's case in rebuttal;
 - 6) Respondent's case in rebuttal;
 - 7) presentation of closing arguments, including legal arguments;
- d) Parties may by stipulation agree upon any facts involved in the proceeding. The facts stipulated shall be considered as evidence in the proceeding. Disposition may be made of any case by stipulation, agreed settlement, consent order or default.

(Source: Former section 200.130 repealed, new section 200.130 renumbered from former section 200.110 and amended at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.140 Amendments

At any time prior to the hearing or before completion of the hearing, amendments shall be allowed for good cause shown to introduce any party who ought to have been joined, to dismiss any party, or to delete, modify or add allegations or defenses. In the event of a change in parties or a substantive amendment to the allegations or defenses immediately preceding or during the hearing, any remaining party may request that the hearing be suspended. Upon such request, the hearing officer shall suspend the hearing for up to fourteen (14) days to provide an opportunity for the parties to respond to such changes in parties or substantive amendments which are introduced immediately preceding or during the hearing.

(Source: Former section 200.140 renumbered to new section 200.190, new section 200.140 adopted at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.150 Burden of Proof

- a) The burden of proof shall be on the Department unless the matter at issue is the denial of an application for licensure or accreditation, or an application for reinstatement of licensure or accreditation which has been previously revoked, suspended, or otherwise terminated. In such cases, the burden of proof shall be on the Respondent.

Ch. II, Sec. 200.150

- b) In the case of any new matter introduced in connection with any affirmative defense, the burden of proof with respect thereto shall be upon the party which alleges such new matter.
- c) The standard of proof with respect to all hearings conducted pursuant to this Part shall be a preponderance of the evidence.

(Source: Former section 200.150 repealed, new section 200.150 adopted at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.160 Witnesses at Hearings

- a) The hearing officer may administer oaths to witnesses.
- b) Both the hearing officer and the parties or their representatives may examine witnesses.
- c) A party may conduct examination and cross-examination which is shown to be necessary to a full and fair disclosure of facts bearing upon matters in issue, provided that such examination or cross-examination does not abuse or harass a witness.

(Source: Former section 200.160 repealed, new section 200.160 adopted at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.170 Evidence at Hearings

- a) When the hearing results from the denial of an application for licensure or accreditation, or denial of an application for reinstatement of licensure or accreditation, the Respondent shall have the right to introduce evidence at the hearing that was not made available to the Department at the time the application was denied. If the hearing officer determines that such additional evidence could have affected the Department's decision to deny the application, the hearing officer shall suspend the hearing to enable appropriate representatives of the Department to consider this additional evidence and to decide whether the decision to deny the application should be modified or reversed.
- b) Irrelevant, immaterial or unduly repetitious evidence shall be excluded. The rules of evidence and privilege as applied in civil cases in the Circuit Courts of this State shall be followed. However, evidence not admissible under such rules of evidence may be admitted (except where precluded by statute) if it is of the type commonly relied upon by reasonably prudent persons in the conduct of their affairs. When the admissibility of evidence is in dispute and depends upon fairly arguable interpretations of law, such evidence shall be admitted. Objections to evidentiary offers may be made and shall be noted in the record. Subject to these requirements, when a hearing will be expedited and the interests of the parties will not be prejudiced, any part of the evidence may be received in written form. Any party may submit evidence in rebuttal.
- c) Accurate summaries of voluminous documents may be admitted into evidence. The document summarized need not itself be admitted into evidence. Copies of the document need not be provided so long as all parties are accorded a reasonable opportunity to inspect the document summarized.

(Source: Former section 200.170 renumbered to new section 200.200, new section 200.170 adopted at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.180 Cross Examination

- a) Subject to the evidentiary requirements of this Part, a party may conduct cross-examination required for a full and fair disclosure of the facts.
- b) If the hearing officer determines that a witness is hostile or unresponsive, the hearing officer shall authorize the examination by the party calling such witness as if under cross-examination.
- c) Any party may call any adverse party as a witness and proceed to examine such adverse party as if under cross-examination except that if the Respondent wants to call a representative of the Department as an adverse witness, he/she may do so only if such representative(s) was directly involved in the determinations which served as the basis for the Department's Preliminary Order under this Part.
- d) Any party calling a witness, upon a showing that he/she called the witness in good faith and is surprised by the testimony of the witness, may impeach that witness by evidence of prior inconsistent statements.

(Source: Former section 200.180 repealed, new section 200.180 adopted at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.190 Official Notice

- a) Official notice may be taken of:
 - 1) Matters of which the Circuit Courts of this State may take judicial notice; and
 - 2) Generally recognized technical or scientific facts within the Department's specialized knowledge.
- b) *Parties shall be notified either before or during a hearing, or by reference in preliminary reports, or otherwise, of the material noticed, including any staff memoranda or data to be offered as evidentiary matter during the course of the hearing, and they shall be afforded an opportunity to contest the material so noticed. The Department's experience, technical competence and specialized knowledge may be utilized in the evaluation of the evidence. (Ill. Rev. Stat. 1985, ch. 127, par. 1012)*

(Source: Former section 200.190 renumbered to new section 200.220, new section 200.190 renumbered from former section 200.140 and amended at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.200 Default

Except for good cause shown, the failure of a party to appear on the date set for hearing or failure to proceed as ordered by the hearing officer or Director shall constitute a default. The Director shall thereafter enter such order as appropriate, in accordance with the Preliminary Order, pleadings and the evidence introduced at the hearing, if any.

(Source: Former section 200.200 renumbered to new section 200.230, new section 200.200 renumbered from former section 200.170 and amended at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.210 Hearing Record

- a) The Department shall designate an official reporter to make and transcribe a stenographic record of the adjudicatory proceedings.
- b) A complete record of the hearing shall include:
 - 1) all pleadings (including all notices, responses, motions, and rulings);
 - 2) evidence received;

- 3) a statement of matters officially noticed;
 - 4) offers of proof, objections and rulings thereon;
 - 5) proposed findings and exceptions;
 - 6) any recommended decision, opinion or report by the hearing officer;
 - 7) staff memoranda or data submitted to the hearing officer or the Department in connection with the consideration of the case; and
 - 8) any ex-parte communication as defined by the provisions of the Illinois Administrative Procedure Act (Ill. Rev. Stat. 1991, ch. 127, par. 1010-60). Such communication shall not form the basis for any finding of fact.
- c) A copy of the record will be reproduced at the request of any party to the review who bears the cost thereof in accordance with Ill. Rev. Stat. 1985, ch. 116, par. 206.
- d) The Department shall be the official custodian of the records of administrative hearings held before the Department.

(Source: Former section 200.210 repealed, new section 200.210 renumbered from former section 200.180 and amended at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.220 Hearing Officer's Report

- a) As soon as practicable after the close of a hearing, the hearing officer shall prepare a written report of the case, which shall be based upon the evidence adduced at the hearing or otherwise included in the record. The written report shall contain findings of fact, a recommended decision and the reasons therefor.
- b) This report shall be submitted to the Director. The hearing officer shall also send a copy of such report to the Respondent or his/her counsel and to the Department's counsel. Both Respondent and the Department's counsel may file written exceptions to the Director within ten (10) days.

(Source: Former section 200.220 repealed, new section 200.220 renumbered from former section 200.190 and amended at 10 Ill. Reg. 17200, effective September 25, 1986)

Section 200.230 Final Decision of the Director

- a) The Director shall reach a final decision in each proceeding, which shall be specified in a written order including findings of fact and conclusions of law separately stated. Findings of fact, if set forth in statutory language, shall be accompanied by a concise and explicit statement of the underlying facts supporting the findings.
- b) A copy of the Order of the Director shall be served personally or by certified or registered mail upon all parties to the proceeding.
- c) The decision of the Director shall be considered a Final Order.

(Source: Section 200.230 renumbered from former section 200.200 and amended at 10 Ill. Reg. 17200, effective September 25, 1986)

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

PART 310
GENERAL PROVISIONS

Section	
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APPENDIX A	Transport Grouping of Radionuclides (Repealed)
APPENDIX B	Tests for Special Form Licensed Material (Repealed)
APPENDIX C	Penalty Assessment Worksheet (Repealed)

AUTHORITY: Implementing and authorized by the Radiation Protection Act of 1990 (Ill. Rev. Stat. 1991, ch. 111 1/2, pars. 210-1 et seq., including P.A. 87-1024 and 87-1166) 420 ILCS 40, including 87-1024, effective September 6, 1992 and P.A. 87-1166, effective September 18, 1992.

SOURCE: Filed April 20, 1974 by the Department of Public Health; transferred to the Department of Nuclear Safety by P.A. 81-1516, effective December 3, 1980; codified at 7 Ill. Reg. 15657; amended at 10 Ill. Reg. 17259, effective September 25, 1986; amended at 15 Ill. Reg. 10604, effective July 15, 1991; amended at 17 Ill. Reg. 18472, effective January 1, 1994.

NOTE: In this Part, superscript numbers or letters are denoted by parentheses, subscript are denoted by brackets.

Section 310.10 Scope

Except as otherwise specifically provided, this Part applies to all persons who receive, possess, use, transfer, own, or acquire any source of radiation within the State of Illinois; provided, however, that nothing in

400, 401 and 601 shall apply to any person to the extent such person is subject to regulation by the U.S. Nuclear Regulatory Commission (NRC).

AGENCY NOTE: Attention is directed to the fact that regulation by the State of source material, by product material, and special nuclear material in quantities not sufficient to form a critical mass is subject to the provisions of an agreement between the State and the NRC and to 10 CFR 150 of the Commission's regulations.

(Source: Amended at 17 Ill. Reg. 18472, effective January 1, 1994)

Section 310.15 Incorporations by Reference

All rules, standards and guidelines of agencies of the United States or nationally recognized organizations or associations that are incorporated by reference in this Part are incorporated as of the date specified in the reference and do not include any later amendments or editions. Copies of these rules, standards and guidelines that have been incorporated by reference are available for public inspection at the Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, Illinois.

AGENCY NOTE: In this Part, the Department has incorporated by reference the appendices to 10 CFR 20, effective as of January 1, 1994. These appendices were originally published at 56 FR 23360 - 23474 (May 21, 1991). Corrections were published at 56 FR 61352 - 61353 (December 3, 1991) and an amendment was published at 57 FR 57877 - 57879 (December 8, 1992). The incorporation includes the 1991 correction and the 1992 amendment.

(Source: Added at 17 Ill. Reg. 18472, effective January 1, 1994)

Section 310.20 Definitions

As used in 32 Ill. Adm. Code 310, 320, 330, 331, 332, 335, 340, 341, 350, 351, 400, 401, 601 and 606, these terms have the definitions set forth below. Additional definitions used only in a certain Part will be found in that Part.

"Absorbed dose" means the energy imparted by ionizing radiation per unit mass of irradiated material. The units of absorbed dose are the gray (Gy) and the rad.

"Accelerator" (particle accelerator) means any machine capable of accelerating electrons, protons, deuterons or other charged particles in a vacuum and of discharging the resultant particulate or other radiation into a medium at energies usually in excess of 1 million electron volts (MeV).

"Accelerator-produced material" means any material made radioactive by a particle accelerator.

"Act" means the Radiation Protection Act of 1990 (the Act) (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 210-1 et seq., including P.A. 87-1024 and 87-1166) 420 ILCS 40, including P.A. 87-1024, effective September 6, 1992 and P.A. 87-1166, effective September 18, 1992.

"Activity" means the rate of disintegration (transformation) or decay of radioactive material. The units of activity are the becquerel (Bq) and the curie (Ci).

"Adult" means an individual 18 or more years of age.

"Agreement State" means any state with which the U. S. Nuclear Regulatory Commission or the U.S. Atomic Energy Commission has entered into an effective agreement under subsection 274b of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2021(b) et seq.).

"Airborne radioactive material" means any radioactive material dispersed in the air in the form of dusts, fumes, particulates, mists, vapors or gases.

"Airborne radioactivity area" means any room, enclosure, or operating area in which airborne radioactive material, composed wholly or partly of licensed material, exists in concentrations:

in excess of the derived air concentrations (DACs) specified in Appendix B to 10 CFR 20.1001 -

20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions; or to such a degree that an individual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6 percent of the annual limit on intake (ALI) or 12 DAC-hours.

"As low as is reasonably achievable" (ALARA) means making every reasonable effort to maintain exposures to radiation as far below the dose limits in 32 Ill. Adm. Code: Chapter II, Subchapters b and d as is practical consistent with the purpose for which the licensed or registered activity is undertaken, taking into account the state of technology, the economics of improvements in relation to the state of technology, the economics of improvements in relation to benefits to the public health and safety and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed or registered sources of radiation in the public interest.

"Background radiation" means radiation from cosmic sources; naturally occurring radioactive materials, including radon (except as a decay product of source or special nuclear material) and global fallout as it exists in the environment from the testing of nuclear explosive devices. Background radiation does not include radiation from radioactive materials regulated by the Department.

"Becquerel" (Bq) means the SI unit of activity. One becquerel (Bq) is equal to 1 disintegration (transformation) per second (dps or tps).

"Bioassay" (radiobioassay) means the determination of kinds, quantities or concentrations and, in some cases, the locations of radioactive material in the human body, whether by direct measurement (in vivo counting) or by analysis and evaluation of materials excreted or removed from the human body.

"Brachytherapy" means a method of radiation therapy in which sealed sources are used to deliver a radiation dose at a distance of less than 6 centimeters, by surface, intracavitary or interstitial application.

"Byproduct material" means: (1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to radiation incident to the process of producing or utilizing special nuclear material; and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface wastes resulting from underground solution extraction processes but not including underground ore bodies depleted by such solution extraction processes. (See Section 4(a) of the Act.)

"Calendar quarter" means not less than 12 consecutive weeks nor more than 14 consecutive weeks. The first calendar quarter of each year shall begin in January and subsequent calendar quarters shall be so arranged such that no day is included in more than one calendar quarter and no day in any one year is omitted from inclusion within a calendar quarter. No licensee or registrant shall change the method observed by him for determining calendar quarters except at the beginning of a year.

"Calibration" means the determination of:
the response or reading of an instrument relative to a series of known radiation values over the range of the instrument; or
the strength of a source of radiation relative to a standard.

"CFR" means Code of Federal Regulations.

"Chelating Agent" means amine polycarboxylic acids (e.g., EDTA, DTPA), hydroxy-carboxylic acids, and polycarboxylic acids (e.g., citric acid, carboic acid, and glucinic acid).

"Collective dose" means the sum of the individual doses received in a given period of time by a specified population from exposure to a specified source of radiation.

"Committed dose equivalent" (H T,50) means the dose equivalent to organs or tissues of reference (T) that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.

"Committed effective dose equivalent" (H E,50) means the sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to each of these organs or tissues (H E,50 = SUM w T H T,50).

"Curie" means a unit of quantity of radioactivity. One Curie (Ci) is that quantity of radioactive material which decays at the rate of 3.7×10^{10} disintegrations (transformations) per second (dps or tps).

"Declared pregnant woman" means any woman who has voluntarily informed her employer, in writing, of her pregnancy.

"Deep dose equivalent" (H d) means the dose equivalent at a tissue depth of 1 centimeter (1000 milligrams per square centimeter) from external whole-body exposure.

"Department" means Illinois Department of Nuclear Safety.

"Depleted uranium" means the source material uranium in which the isotope uranium-235 is less than 0.711 weight percent of the total uranium present. Depleted uranium does not include special nuclear material.

"Director" means the Director of the Department of Nuclear Safety. (See Section 4(c) of the Act.)

"Dose" (radiation dose) means either absorbed dose, dose equivalent, effective dose equivalent, committed dose equivalent, committed effective dose equivalent, total organ dose equivalent or total effective dose equivalent.

"Dose equivalent" (H T) means the product of the absorbed dose in tissue, quality factor and all other necessary modifying factors (e.g., a distribution factor for non-uniform deposition) at the location of interest. The units of dose equivalent are the sievert (Sv) and the rem.

"Dose limits" (limits) means the permissible upper bounds of radiation doses established by, or in accordance with, 32 Ill. Adm. Code: Chapter II, Subchapters b and d.

"Dosimetry processor" means an individual or an organization that processes and evaluates individual monitoring devices in order to determine the radiation dose delivered to such devices.

"Effective dose equivalent" (H E) means the sum of the products of the dose equivalent to each organ or tissue (H T) and the weighting factor (W T) applicable to each of the body organs or tissues that are irradiated ($H E = \sum W T H T$).

"Embryo/fetus" means the developing human organism from conception until the time of birth.

"Entrance or access point" means any opening through which an individual or extremity of an individual could gain access to radiation areas or to licensed radioactive materials. This includes entry or exit portals of sufficient size to permit human entry, irrespective of their intended use.

"Exposure" means:

the quotient of dQ divided by dm where "dQ" is the absolute value of the total charge of the ions of one sign produced in air when all the electrons (negatrons and positrons) liberated by photons in a volume element of air having mass "dm" are completely stopped in air. (See Section 310.140 for SI unit coulomb per kilogram (C/kg) and the special unit roentgen (R).); or irradiation by ionizing radiation or radioactive material.

AGENCY NOTE: The context makes clear which is the appropriate definition.

"Exposure rate" means the "exposure" per unit of time, such as roentgen per minute (R/min) and milliroentgen per hour (mR/h).

"External dose" means that portion of the dose equivalent received from any source of radiation outside the body.

"Extremity" means a hand, elbow, arm below the elbow, foot, knee and leg below the knee.

"Eye dose equivalent" means the external dose equivalent to the lens of the eye at a tissue depth of 0.3 centimeter (300 milligrams per square centimeter).

"Former U.S. Atomic Energy Commission (AEC) or U.S. Nuclear Regulatory Commission (NRC) licensed facilities" means nuclear reactors, nuclear fuel reprocessing plants, uranium enrichment plants, or critical mass experimental facilities where AEC or NRC licenses have been terminated.

"Gray" (Gy) means the SI unit of absorbed dose. One gray is equal to an absorbed dose of 1 joule per kilogram (J/kg)(100 rad).

"Healing Arts" means the art or science or group of arts or sciences dealing with the prevention and cure or alleviation of human ailments, diseases or infirmities, and has the same meaning as "medicine" when the latter term is used in its comprehensive sense.

"High radiation area" means any area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 1 mSv

(0.1 rem) in 1 hour at 30 centimeters from any source of radiation or from any surface that the radiation penetrates.

"Human use" means the internal or external administration of radiation or radioactive materials to human beings.

"Individual" means any human being.

"Individual monitoring" means the assessment of:

Dose equivalent by the use of individual monitoring devices or by the use of survey data; or Committed effective dose equivalent by bioassay or by determination of the time-weighted air concentrations to which an individual has been exposed (i.e., DAC-hours). (For the definition of DAC-hours, see 32 Ill. Adm. Code 340.30.)

"Individual monitoring devices" (personnel dosimeter or dosimeter) means devices designed to be worn by a single individual for the assessment of dose equivalent. Examples of individual monitoring devices are film badges, thermoluminescent dosimeters (TLDs), pocket ionization chambers, personal air sampling devices and electronic dosimeters (e.g., silicon diode dosimeters).

"Inspection" means an official examination or observation including, but not limited to, tests, surveys, and monitoring to determine compliance with rules, regulations, orders, requirements, and conditions of the Department.

"Interlock" means a device arranged or connected such that the occurrence of an event or condition is required before a second event or condition can occur or continue to occur.

"Internal dose" means that portion of the dose equivalent received from radioactive material taken into the body.

"License" means any license issued by the Department in accordance with 32 Ill. Adm. Code: Chapter II, Subchapters b and d.

"Licensed material" means radioactive material received, possessed, used, transferred or disposed of under a general or specific license issued by the Department.

"Licensee" means any person who is licensed by the Department in accordance with 32 Ill. Adm. Code: Chapter II, Subchapters b and d.

"Licensing State" means any state which has been provisionally or finally designated as such by the Conference of Radiation Control Program Directors, Inc., which reviews state regulations to establish equivalency with the Suggested State Regulations and ascertains whether a state has an effective program for control of naturally occurring or accelerator-produced radioactive material (NARM). The Conference will designate as licensing states those states with regulations for control of radiation relating to, and an effective program for the regulatory control of, NARM.

"Lost or missing source of radiation" means any licensed or registered source of radiation whose location is unknown. This definition includes, but is not limited to, radioactive material that has been shipped but has not reached its planned destination and whose location cannot be readily traced in the transportation system.

"Major processor" means a person, other than medical programs, universities, industrial radiography services, or wireline service operations, who is licensed to process, handle, or manufacture radioactive material as unsealed sources in quantities exceeding the quantities specified in Appendix C to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions, by a factor of at least 10(3), or radioactive material as sealed sources in quantities exceeding the quantities specified in Appendix C to 10 CFR 20.1001 - 20.2401 by factor of at least 10(10).

"Member of the public" means any individual, except an individual who is performing assigned duties for the licensee or registrant involving exposure to sources of radiation.

"Minor" means an individual less than 18 years of age.

"Monitoring" (radiation monitoring or radiation protection monitoring) means the measurement of radiation, radioactive material concentrations, surface area activities or quantities of radioactive material and the use of the results of these measurements to evaluate potential exposures and doses.

"NARM" means any naturally occurring or accelerator-produced radioactive material. It does not include by product, source, or special nuclear material.

"Natural radioactivity" means radioactivity of naturally occurring nuclides.

"Nuclear Regulatory Commission" (NRC) means the U.S. Nuclear Regulatory Commission or its duly authorized representatives.

"Occupational dose" means the dose received by an individual in the course of employment in which the individuals assigned duties for the licensee or registrant involve exposure to sources of radiation. Occupational dose does not include dose received from background radiation, as a patient from medical practices, from voluntary participation in medical research programs, or as a member of the public.

"Operator" means any individual, group of individuals, partnership, firm, corporation or association conducting the business or activities carried on within a radiation installation.

"Package" means the packaging, together with its radioactive contents, as presented for transport.

"Packaging" means the assembly of components necessary to ensure compliance with the packaging requirements of 32 Ill. Adm. Code 341. It may consist of one or more receptacles, absorbent materials, spacing structures, thermal insulation, radiation shielding and devices for cooling or absorbing mechanical shocks. The vehicle, tie down system and auxiliary equipment may be designated as part of the packaging.

"Person" means any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, agency, political subdivision of this State, any other State or political subdivision or agency thereof, and any legal successor, representative, agent, or agency of the foregoing, other than the United States Nuclear

Regulatory Commission, or any successor thereto, and other than federal government agencies licensed by the United States Nuclear Regulatory Commission, or any successor thereto. (See Section 4(e) of the Act.)

"Personnel monitoring equipment" (see "Individual monitoring devices").

"Pharmacist" means an individual licensed by the State pursuant to the Pharmacy Practice Act of 1987 (Ill. Rev. Stat. 1991, ch. 111, par. 4121 et seq.) 225 ILCS 85 to compound and dispense drugs, prescriptions, and poisons.

"Physician" means an individual licensed to practice a treatment of human ailments by virtue of the Medical Practice Act of 1987 (Ill. Rev. Stat. 1991, ch. 111, par. 4400-1 et seq.) 225 ILCS 60, The Illinois Dental Practice Act (Ill. Rev. Stat. 1991, ch. 111, par. 2301 et seq.) 225 ILCS 25 or the Podiatric Medical Practice Act of 1987 (Ill. Rev. Stat. 1991, ch. 111, par. 4801 et seq.) 225 ILCS 100, who may use radiation for therapeutic, diagnostic, or other medical purposes within the limits of the individual's licensure.

"Protective apron" means any apron made of radiation attenuating materials, at least 0.25 millimeter lead equivalent, that may be used to reduce exposure to radiation.

"Public dose" means the dose received by a member of the public from sources of radiation from licensed or registered operations. Public dose does not include occupational dose, or dose received from background radiation, as a patient from medical practices or from voluntary participation in medical research programs.

"Qualified engineering expert" means any person qualified under the Illinois Architecture Practice Act of 1989 (Ill. Rev. Stat. 1991, ch. 111, par. 1301 et seq.) 225 ILCS 305, the Structural Engineering Licensing Act of 1989 (Ill. Rev. Stat. 1991, ch. 111, par. 6601 et seq.) 225 ILCS 340 and/or any required combination thereof.

"Quality factor" (Q) means the modifying factor (listed in Section 310.140, Tables 1 and 2) that is used to derive dose equivalent from absorbed dose.

"Rad" means the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs per gram or 0.01 joule per kilogram (J/kg) (0.01 Gy).

"Radiation" (ionizing radiation) means *gamma rays and x-rays, alpha and beta particles, high-speed electrons, neutrons, protons, and other nuclear particles, but not sound or radio waves, or visible infrared or ultraviolet light.* (See Section 4(f) of the Act.)

"Radiation area" means an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 0.05 mSv (0.005 rem) in 1 hour at 30 centimeters from the source of radiation or from any surface that the radiation penetrates.

"Radiation dose" (see "Dose").

"Radiation Installation" is any location or facility where radiation machines are used or where radioactive material is produced, transported, stored, disposed or used for any purpose, (See Section 4(g) of the Act.) except

where such radioactive materials or facility are subject to regulation by the NRC.

"Radiation machine" means *any device that produces radiation when in use* (See Section 4(h) of the Act.) except those which produce radiation only from radioactive materials.

"Radiation safety officer" means an individual who has the knowledge and responsibility to apply appropriate radiation protection regulations and has been assigned such responsibility by the licensee or registrant.

"Radioactive material" means *any solid, liquid, or gaseous substance which emits radiation spontaneously*. (See Section 4(i) of the Act.)

"Radioactivity" means the disintegration (transformation) of unstable atomic nuclei by the emission of radiation.

"Radiobioassay" (see "Bioassay").

"Registrant" means any person who is registered with the Department and is legally obligated to register with the Department pursuant to the Radiation Installation Act (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 195 et seq.) 420 ILCS 30 and 321Ill. Adm. Code 320.10.

"Registration" means registration with the Department in accordance with 32 Ill. Adm. Code 320.10.

"Regulations of the U.S. Department of Transportation" (U.S. DOT) means the regulations in 49 CFR 100-189, revised as of October 1, 1991, exclusive of any subsequent amendments or editions.

"Rem" means the special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rem is equal to the absorbed dose in rad multiplied by the quality factor (1 rem = 0.01 Sv).

"Research and development" means:
theoretical analysis, exploration, or experimentation; or
the extension of investigative findings and theories of a scientific or technical nature into practical application for experimental and demonstration purposes, including the experimental production and testing of models, devices, equipment, materials, and processes. Research and development does not include the internal or external administration of radiation or radioactive material to human beings.

"Restricted area" means any area access to which is limited by the licensee or registrant for purposes of protecting individuals against undue risks from exposure to sources of radiation. Restricted area shall not include areas used for residential quarters, but separate rooms in a residential building may be set apart as a restricted area.

"Roentgen" means the special unit of exposure. One roentgen (R) equals 2.58×10^{-4} coulombs per kilogram (C/kg). (See "Exposure" and Section 310.140.)

"Sealed source" means *any device containing radioactive material to be used as a source of radiation which has been constructed in such a manner as to prevent the*

escape of any radioactive material. (See Ill. Rev. Stat. 1991, ch. 111 1/2, par. 194(f).) 420 ILCS 30/1(f)

"Shallow dose equivalent" (H_s), which applies to the external exposure of the skin or an extremity, means the dose equivalent at a tissue depth of 0.007 centimeter (7 milligrams per square centimeter) averaged over an area of 11 square centimeter.

"SI" means the abbreviation for the International System of Units.

"Sievert" (Sv) means the SI unit of any of the quantities expressed as dose equivalent. The dose equivalent in sievert is equal to the absorbed dose in gray multiplied by the quality factor (1 Sv = 100 rem).

"Source material" means:

uranium or thorium, or any combination thereof, in any physical or chemical form; or
ores which contain by weight one-twentieth of one percent (0.05 percent) or more of uranium, thorium or any combination thereof.

Source material does not include special nuclear material.

"Source of radiation" means any radioactive material or any device or equipment emitting, or capable of producing, radiation.

"Special form radioactive material" means radioactive material that satisfies the following conditions:

It is either a single solid piece or is contained in a sealed capsule that can be opened only by destroying the capsule;
The piece or capsule has at least one dimension not less than 5 millimeters (0.197 inch); and
It satisfies the test requirements specified in 10 CFR 71.75 and 71.77, revised as of January 1, 1991, exclusive of subsequent amendments or editions, except that special form radioactive material designed or constructed prior to July 1, 1985 need only meet the requirements of 10 CFR 71.75 and 71.77 in effect on June 30, 1983.

"Special nuclear material" means: (1) *plutonium, uranium 233, uranium enriched in the isotope 233 or in the isotope 235 and any other material which the Department declares by order to be special nuclear material after the United States Nuclear Regulatory Commission, or any successor thereto, has determined the material to be such, but does not include source material; or (2) any material artificially enriched by any of the foregoing, but does not include source material*. (See Section 4(1) of the Act.)

"Special nuclear material in quantities not sufficient to form a critical mass" means uranium enriched in the isotope U-235 in quantities not exceeding 350 grams of contained U-235; U-233 in quantities not exceeding 200 grams; plutonium in quantities not exceeding 200 grams; or any combination of them, except source material, in accordance with the following formula: For each kind of special nuclear material, determine the ratio between the quantity of that special nuclear material and the quantity specified above for the same kind of special nuclear material. The sum of such ratios for all of the kinds of special nuclear material in combination shall not exceed one. For example, the following quantities in combination would not exceed the limitation and are within the formula:

$$\frac{175 \text{ (grams contained U-235)}}{350} \frac{M50 \text{ (grams U-233)}}{200} \frac{M50 \text{ (grams Pu)}}{200} = 1$$

"Survey" means an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of sources of radiation. Such an evaluation includes, but is not limited to, measurements or calculations of levels of radiation, or concentrations or quantities of radioactive material present.

"Test" means the process of verifying compliance with an applicable regulation.

"Total effective dose equivalent" (TEDE) means the sum of the deep dose equivalent for external exposures and the committed effective dose equivalent for internal exposures.

"Total organ dose equivalent" (TODE) means the sum of the deep dose equivalent and the committed dose equivalent to the organ receiving the highest dose as described in 32 Ill. Adm. Code 340.1160(a)(6).

"Unrefined and unprocessed ore" means ore in its natural form prior to any processing, such as grinding, roasting, beneficiating or refining.

"Unrestricted area" means any area access to which is not controlled by the licensee or registrant for purposes of protection of individuals from exposure to radiation and radioactive material, and any area used for residential quarters.

AGENCY NOTE: Licensees or registrants may control access to certain areas for purposes other than radiation protection, but such action does not affect whether the areas are unrestricted areas as defined in this Part.

"Uranium fuel cycle" means the operations of milling of uranium ore, chemical conversion of uranium, isotopic enrichment of uranium, fabrication of uranium fuel, generation of electricity by a light-water-cooled nuclear power plant using uranium fuel and reprocessing of spent uranium fuel to the extent that these activities directly support the production of electrical power for public use. Uranium fuel cycle does not include mining operations, operations at waste disposal sites, transportation of radioactive material in support of these operations and the reuse of recovered non-uranium special nuclear and by product materials from the cycle.

"U.S. Department of Energy" means the agency created by the Department of Energy Organization Act (established by P.L. 95-91, 91 Stat. 565, 42 U.S.C. 7101 et seq.), to the extent that the Department of Energy, or its duly authorized representatives, exercises functions formerly vested in the U.S. Atomic Energy Commission, its Chairman, members, officers and components and transferred to the U.S. Energy Research and Development Administration and to the Administrator thereof pursuant to sections 104(b), (c) and (d) of the Energy Reorganization Act of 1974 (P.L. 93-438, 88 Stat. 1233 at 1237, 42 U.S.C. 5814) and retransferred to the Secretary of Energy pursuant to section 301(a) of the Department of Energy Organization Act (P.L. 95-91, 91 Stat. 565 at 577-578, 42 U.S.C. 7151).

"Very high radiation area" means an area, accessible to individuals, in which radiation levels could result in an individual receiving an absorbed dose in excess of 5 Gy (500 rad) in 1 hour at 1 meter from a source of radiation or from any surface that the radiation penetrates.

AGENCY NOTE: For very high doses received at high dose rates, units of absorbed dose (e.g., gray and rad) are appropriate rather than units of dose equivalent (e.g., sievert and rem).

"Waste handling licensee" means a person licensed by the NRC, the Department, an Agreement State or a Licensing State to receive radioactive wastes for storage, treatment, or both storage and treatment prior to disposal as well as any person licensed to receive radioactive waste for disposal away from the point of generation.

"Week" means 7 consecutive days starting on Sunday.

"Whole body" means, for purposes of external exposure, head, trunk (including male gonads), arms above the elbow or legs above the knee.

"Worker" means any individual engaged in work under a license or registration issued by the Department and controlled by a licensee or registrant, but does not include the licensee or registrant.

"Working level" (WL) means any combination of short-lived radon daughters in 1 liter of air that will result in the ultimate emission of 1.3×10^5 MeV of potential alpha particle energy. The short-lived radon daughters are for radon-222: polonium-218, lead-214, bismuth-214 and polonium-214; and for radon-220: polonium-216, lead-212, bismuth-212 and polonium-212.

"Working level month" (WLM) means an exposure to 1 working level (WL) for 170 hours. (2,000 working hours per year divided by 12 months per year is approximately equal to 170 hours per month.)

"Year" means the period of time beginning in January used to determine compliance with the provisions of 32 Ill. Adm. Code: Chapter II, Subchapters b and d. The licensee or registrant may change the starting date of the year used to determine compliance by the licensee or registrant provided that the decision to make the change is made not later than December 31 of the previous year. If a licensee or registrant changes a year, the licensee or registrant shall assure that no day is omitted or duplicated in consecutive years.

(Source: Amended at 17 Ill. Reg. 18472, effective January 1, 1994)

Section 310.30 Exemptions

- a) General Provisions - The Department may, upon application therefor or upon its own initiative, grant such exemptions or exceptions from the requirements of 32 Ill. Adm. Code: Chapter II, Subchapters b and d as it determines are authorized by law and will not result in undue hazard to public health and safety or property.
- b) U. S. Department of Energy Contractors and U. S. Nuclear Regulatory Commission Contractors - Any U. S. Department of Energy contractor or subcontractor and any U. S. Nuclear Regulatory Commission contractor or subcontractor of the following categories operating within this State is exempt from 32 Ill. Adm. Code: Chapter II,

Subchapters b and d to the extent that such contractor or subcontractor under his contract receives, possesses, uses, transfers or acquires sources of radiation:

- 1) Prime contractors performing work for the Department of Energy at U. S. Government-owned or controlled sites, including the transportation of sources of radiation to or from such sites and the performance of contract services during temporary interruptions of such transportation;
- 2) Prime contractors of the Department of Energy performing research in, or development, manufacture, storage, testing or transportation of, atomic weapons or components thereof;
- 3) Prime contractors of the Department of Energy using or operating nuclear reactors or other nuclear devices in a United States Government-owned vehicle or vessel; and
- 4) Any other prime contractor or subcontractor of the Department of Energy or of the Nuclear Regulatory Commission when the State and the Nuclear Regulatory Commission jointly determine:
 - A) that, under the terms of the contract or subcontract, there is adequate assurance that the work thereunder can be accomplished without undue risk to the public health and safety; and
 - B) that, the exemption of such contractor or subcontractor is otherwise appropriate.

(Source: Amended at 15 Ill. Reg. 10604, effective July 15, 1991)

Section 310.40 Records

Each licensee and registrant shall maintain records showing the receipt, transfer, use, storage and disposal of all sources of radiation. Additional record requirements are specified elsewhere in 32 Ill. Adm. Code: Ch. II, Subchapters b and d.

(Source: Amended at 15 Ill. Reg. 10604, effective July 15, 1991)

Section 310.50 Inspections

- a) Each person shall afford the Department at all reasonable times opportunity to inspect radiation installations and sources of radiation and the premises and facilities wherein such radiation installations and sources of radiation are used or stored.
- b) Each person shall make available to the Department for inspection, upon reasonable notice, records maintained pursuant to 32 Ill. Adm. Code: Chapter II, Subchapters b and d.
- c) *The Department shall have the power to enter at all reasonable times upon any private or public property for the purpose of determining whether or not there is compliance with or violation of the provisions of this Act and rules and regulations issued thereunder, except that entry into areas under jurisdiction of the Federal Government shall be effected only with the concurrence of the Federal Government or its duly designated representative. (See Section 27 of the Act.)*

(Source: Amended at 15 Ill. Reg. 10604, effective July 15, 1991)

Section 310.60 Tests

Each licensee and registrant shall perform upon instructions from the Department, or shall permit the Department to perform, such reasonable tests as the Department deems appropriate or necessary including, but not limited to tests of:

- a) sources of radiation;
- b) installations wherein sources of radiation are used or stored;
- c) radiation detection and monitoring instruments; and
- d) other equipment and devices used in connection with utilization or storage of licensed or registered sources of radiation.

(Source: Amended at 10 Ill. Reg. 17259, effective September 25, 1986)

Section 310.70 Additional Requirements

- a) The Department is authorized to inspect and investigate the premises and operations and personnel of any radiation installation, whether or not such installation is required to be registered or licensed by the Department, for the purpose of studying and evaluating the health hazard(s) caused by the use and operation of such machines and material.
- b) The Department may impose additional requirements upon any licensee or registrant if the Department deems these requirements to be necessary to minimize the danger to public health and safety or the environment.

(Source: Amended at 10 Ill. Reg. 17259, effective September 25, 1986)

Section 310.80 Violations

- a) *Any person who shall violate any of the provisions of, or who fails to perform any duty imposed by this Act, or who violates any determination or order of the Department promulgated pursuant to the Act is guilty of a Class A misdemeanor; provided each day during which violation continues shall constitute a separate offense; and in addition thereto, such person may be enjoined from continuing such violation as hereinafter provided. (See Section 39 of the Act.)*
- b) *Whenever the Department believes upon inspection and examination of a radiation installation or a radiation source as constructed, operated, or maintained that there has been a violation of any of the Department's rules or regulations promulgated pursuant to the Act, the Department, in addition to taking other enforcement action, may impose a civil penalty, not to exceed \$10,000 for such violation, provided each day the violation continues shall constitute a separate offense. (See Section 36 of the Act.)*
- c) *The penalties provided herein shall be recoverable in an action brought in the name of the people of the State of Illinois by the Attorney General. (See Section 39 of the Act.)*

(Source: Amended at 17 Ill. Reg. 18472, effective January 1, 1994)

Section 310.81 Policy for Assessment Civil Penalties

- a) *Whenever the Department believes upon inspection and examination of a radiation installation or a radiation source as constructed, operated or maintained that there has been a violation of any of the provisions of the Act or of any rules or regulations promulgated pursuant to the Act, the Department, in addition to taking other*

enforcement action, *may impose a civil penalty not to exceed \$10,000 for such violation.* (See Section 36 of the Act.) Penalties shall be assessed in accordance with the provisions of this Section and Section 310.82.

- b) A civil penalty will be assessed whenever the Department, based on consideration of the factors set forth in subsection (c) below, determines that a civil penalty is appropriate and issues a Preliminary Order and Notice of Opportunity for Hearing, in accordance with 32 Ill. Adm. Code 200.60.

c) Factors to be Considered in Assessing Civil Penalties

- 1) The Department shall consider the factors contained in subsection (c)(2) below to determine whether a penalty should be assessed, as provided in subsection (d) below, and the amount of the penalty. However, if the Department has by rule established the amount to be assessed for a particular violation, the Department shall assess the penalty as specified in that rule without regard to the factors contained in subsection (c)(2) below.

AGENCY NOTE: For an example of a rule that establishes the amount of the civil penalty to be assessed, see 32 Ill. Adm. Code 401.170, which specifies the civil penalties to be assessed for violations of the Department's radiologic technologist accreditation requirements.

- 2) The factors to be considered by the Department are:

- A) History of Previous Violations. The Department shall consider the person's history of previous violations of the Radiation Protection Act of 1990, the Department's rules promulgated under that Act, and licenses issued pursuant to the Act. Each prior violation will be considered without regard to whether it led to a civil penalty assessment. A prior violation shall not be considered, however, if the notice or order relating to the prior violation is the subject of pending administrative or judicial review, or if the time to request such review or to appeal any administrative or judicial decision relating to the prior violation has not expired. The Department shall not consider a prior violation if a Preliminary or Final Order pertaining to that prior violation has been vacated. The Department shall not consider previous violations that occurred more than six years prior to the issuance of the Preliminary Order.

- B) Severity of the Violation. The Department shall consider the severity of the violation, including, but not limited to, actual or potential contamination of the environment resulting from the violation and any actual or potential hazard to the health or safety of the public or to workers, resulting from the violation. When evaluating the severity of the violation, the Department may also consider the impact that the violation has on the Department's ability to determine compliance with requirements established by statute, regulation or license condition.

- C) Culpability. The Department shall consider whether the person to whom the Preliminary Order was issued was negligent in causing, allowing, or failing to correct the violation, condition, or practice which was cited in the Preliminary Order. The Department shall also consider:

- i) whether the violation was intentional or inadvertent;
- ii) whether the violation was allowed to continue once identified;
- iii) whether actions were taken to correct or mitigate the violation and the timeliness of such actions; and
- iv) whether the violation was voluntarily reported to the Department.

d) Determination of the Amount of Penalty; Assessment of Separate Violations for Each Day

- 1) The Department may assess a civil penalty not to exceed ten thousand dollars (\$10,000) per violation for each day the violation continues. In determining whether to make such an assessment, the Department shall consider the factors listed in subsection (c) above; however, if the Department's rules specify the amount of the civil penalty to be assessed for a particular violation, the Department shall assess the civil penalty in that amount so specified, without consideration of the factors listed in subsection (c) above.

- 2) When determining the amount of penalty, the Department shall consider each day of a continuing violation to be a separate violation. Accordingly, the Department may assess a separate penalty, in accordance with this Section and Section 310.82, for each day that a violation continues.

(Source: Amended at 17 Ill. Reg. 18472, effective January 1, 1994)

Section 310.82 Procedures for Assessment of Civil Penalties

a) Issuance of Assessment

- 1) If the Department assesses a civil penalty pursuant to Section 310.81(b), it shall do so by issuing a Preliminary Order and Notice of Opportunity for Hearing pursuant to 32 Ill. Adm. Code 200.
- 2) The Preliminary Order and Notice of Opportunity for Hearing shall contain, for each violation alleged, the proposed civil penalty to be assessed and the Department's basis for proposing the assessment.

b) Payment of Assessment

Unless a hearing has been requested by the deadline specified in the Preliminary Order and Notice of Opportunity for Hearing, within thirty (30) days after issuance of the Preliminary Order, the person upon whom the penalty was assessed shall pay the penalty in full.

c) Procedures for Hearing

- 1) The person to whom the Preliminary Order and Notice of Opportunity for Hearing was issued may appeal the imposition of the civil penalty by submitting a written request for a hearing in accordance with 32 Ill. Adm. Code 200.70.
- 2) Upon receiving such a request for a hearing, the Department shall conduct a public hearing regarding the finding of violation or the penalty assessment, in accordance with the provisions of 32 Ill. Adm. Code 200.
- 3) After the hearing is held, the Director shall issue a Final Order in accordance with 32 Ill. Adm. Code 200.230.

d) Final Assessment and Payment of Penalty

- 1) If the person to whom a Preliminary Order and Notice of Opportunity for Hearing is issued fails to request a hearing as provided in subsection (b)

above, the Preliminary Order shall become a final order of the Department and the penalty assessed shall become due and payable within the thirty (30) days from issuance of the Preliminary Order.

- 2) If either the person to whom a Preliminary Order and Notice of Opportunity for Hearing is issued requests judicial review of a final order of the Department, the penalty assessed in accordance with Section 310.81(c) shall not be payable until completion of the review.
- 3) The civil penalties provided herein shall be recoverable in an action brought in the name of the people of the State of Illinois by the Attorney General.

(Source: Amended at 17 Ill. Reg. 18472, effective January 1, 1994)

Section 310.90 Impounding

- a) *Authority of Department in cases constituting an immediate threat to health. Notwithstanding any other provision of the Act, whenever the Department finds that a condition exists which constitutes an immediate threat to health due to the violation of any provisions of this Act or any code, rule, regulation or order promulgated under this Act and requiring immediate action to protect the public health or welfare, it may issue an order reciting the existence of such an immediate threat and the findings of the Department pertaining thereto. The Department may summarily cause the abatement of such violation or may direct the Attorney General to obtain an injunction against such violator. (See Section 38 of the Act.)*
- b) *Such order shall be effective immediately but shall include notice of the time and place of a public hearing before the Department to be held within 30 days of the date of such order to assure the justification of such order. On the basis of such hearing the Department shall continue such order in effect, revoke it or modify it. Any party affected by an order of the Department shall have the right to waive the public hearing proceedings. (See Section 38 of the Act.)*

(Source: Amended at 15 Ill. Reg. 10604, effective July 15, 1991)

Section 310.100 Prohibited Uses

- a) Hand-held fluoroscopic screens shall not be used with x-ray equipment.
- b) Shoe-fitting fluoroscopic devices shall not be used.

(Source: Amended at 17 Ill. Reg. 18472, effective January 1, 1994)

Section 310.110 Communications

All communications and reports concerning these regulations, and applications filed thereunder, should be addressed to the Department at its office, located at 1035 Outer Park Drive, Springfield, Illinois, 62704.

Section 310.120 Plans and Specifications

The Director may require the user of any new or altered radiation installation to prepare plans and specifications of the proposed installation and submit them to the Department for review and approval prior to starting construction or operation.

(Source: Added at 10 Ill. Reg. 17259, effective September 25, 1986)

Section 310.130 The International System of Units (SI) (Repealed)

(Source: Repealed at 17 Ill. Reg. 18472, effective January 1, 1994)

Section 310.140 Units of Exposure and Radiation Dose

- a) As used in 32 Ill. Adm. Code: Chapter II, Subchapters b and d, the unit of exposure is the coulomb per kilogram (C/kg) or roentgen (R). One roentgen (R) is equal to 2.58×10^{-4} C/kg.
- b) As used in 32 Ill. Adm. Code: Chapter II, Subchapters b and d, the units of radiation dose are:
 - 1) "Gray" (Gy) is the SI unit of absorbed dose. One Gy is equal to an absorbed dose of 1 joule per kilogram (J/kg). (1 Gy = 100 rad).
 - 2) "Rad" is the special unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs per gram or 0.01 joule per kilogram (J/kg). (1 rad = 0.01 Gy).
 - 3) "Rem" is the special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rem is equal to the absorbed dose in rad multiplied by the quality factor (1 rem = 0.01 Sv).
 - 4) "Sievert" (Sv) is the SI unit of any of the quantities expressed as dose equivalent. The dose equivalent in sievert is equal to the absorbed dose in gray multiplied by the quality factor (1 Sv = 100 rem).
- c) As used in 32 Ill. Adm. Code: Chapter II, Subchapters b and d, the quality factors for converting absorbed dose to dose equivalent are as follows:

Type of Radiation	Quality Factor (Q)	Absorbed Dose Equal to a Unit Dose Equivalent(a)
X, gamma or beta radiation and high-speed electrons	1	1
Alpha particles, multiple-charged particles, fission fragments and heavy particles of unknown charge	20	0.05
Neutrons of unknown energy	10	0.1
High-energy protons	10	0.1

* Absorbed dose in gray equal to 1 Sv or the absorbed dose in rad equal to 1 rem.

- d) If it is more convenient to measure the neutron fluence rate than to determine the neutron dose equivalent rate in rem per hour or sievert per hour, as provided in subsection (c), 0.01 Sv (1 rem) of neutron radiation of unknown energies may, for purposes of 32 Ill. Adm. Code: Chapter II, Subchapters b and d, be assumed to result from a total fluence of 25 million neutrons per square centimeter incident upon the body. If sufficient information exists to estimate the approximate energy distribution of the neutrons, the licensee may convert a measured tissue dose in gray (rad) to dose equivalent in sievert (rem) by using the fluence rate per unit dose equivalent or the appropriate Q value shown below.

Section 310.APPENDIX C Penalty Assessment Worksheet
(Repealed)

(Source: Repealed at 17 Ill. Reg. 18472, effective January 1, 1994)

Neutron Energy (MeV)	Quality Factor(a) (Q)	Fluence per Unit Dose Equivalent(b) (neutrons cm(-2) Sv(-1))	Fluence per Unit Dose Equivalent(b) (neutrons cm(-2) rem (-1))
2.5 (E-8) (thermal)	2	980 E(8)	980 E(6)
1 E(-7)	2	980 E(8)	980 E(6)
1 E(-6)	2	810 E(8)	810 E(6)
1 E(-5)	2	810 E(8)	810 E(6)
1 E(-4)	2	840 E(8)	840 E(6)
1 E(-3)	2	980 E(8)	980 E(6)
1 E(-2)	2.5	1010 E(8)	1010 E(6)
1 E(-1)	7.5	170 E(8)	170 E(6)
5 E(-1)	11	39 E(8)	39 E(6)
1	11	27 E(8)	27 E(6)
2.5	9	29 E(8)	29 E(6)
5	8	23 E(8)	23 E(6)
7	7	24 E(8)	24 E(6)
10	6.5	24 E(8)	24 E(6)
14	7.5	17 E(8)	17 E(6)
20	8	16 E(8)	16 E(6)
40	7	14 E(8)	14 E(6)
60	5.5	16 E(8)	16 E(6)
1 E(2)	4	20 E(8)	20 E(6)
2 E(2)	3.5	19 E(8)	19 E(6)
3 E(2)	3.5	16 E(8)	16 E(6)
4 E(2)	3.5	14 E(8)	14 E(6)

(a) Value of quality factor (Q) at the point where the dose equivalent is maximum in a 30-centimeter diameter cylinder tissue-equivalent phantom.

(b) Monoenergetic neutrons incident normally on a 30-centimeter diameter cylinder tissue-equivalent phantom.

(Source: Added at 17 Ill. Reg. 18472, effective January 1, 1994)

Section 310.150 Units of Activity

For the purposes of 32 Ill. Adm. Code: Chapter II, Subchapters b and d, activity is expressed in the SI unit of becquerel (Bq) or in the special unit of curie (Ci), or their multiples, or disintegrations (transformations) per unit of time (dps, dpm, tps or tpm).

- One becquerel (Bq) = 1 disintegration (transformation) per second (dps or tps).
- One curie (Ci) = 3.7×10^{10} disintegrations (transformations) per second (dps or tps) = 3.7×10^{10} becquerel (Bq) = 2.22×10^{12} disintegrations (transformations) per minute (dpm or tpm).

(Source: Added at 17 Ill. Reg. 18472, effective January 1, 1994)

Section 310.APPENDIX A Transport Grouping of Radionuclides
(Repealed)

(Source: Repealed at 10 Ill. Reg. 17259, effective September 25, 1986)

Section 310.APPENDIX B Tests for Special Form Licensed
Material (Repealed)

(Source: Repealed at 10 Ill. Reg. 17259, effective September 25, 1986)

TITLE 32: ENERGY**CHAPTER II: DEPARTMENT OF NUCLEAR SAFETY****SUBCHAPTER b: RADIATION PROTECTION****PART 320****REGISTRATION OF RADIOACTIVE MATERIAL, RADIATION MACHINES, AND RADIATION INSTALLATIONS**

Section

320.10	Registration
320.15	Incorporations by Reference
320.20	Amendments
320.30	Discontinued Use
320.40	Exemptions
320.50	Noncompliance

AUTHORITY: Implementing and authorized by the Radiation Installation Act 420 ILCS 30 .

SOURCE: Filed April 20, 1974 by the Department of Public Health; transferred to the Department of Nuclear Safety by P.A. 81-1516, effective December 3, 1980; codified at 7 Ill. Reg. 11278; amended at 10 Ill. Reg. 17529, effective September 25, 1986; amended at 14 Ill. Reg. 13644, effective August 13, 1990; amended at 18 Ill. Reg. 3363, effective February 22, 1994; amended at 20 Ill. Reg. 6912, effective May 1, 1996.

Section 320.10 Registration

a) Installation Registration

- 1) Any operator of a facility where radiation machines are used or where radioactive material is produced, transported, stored, used or disposed of for any purpose, which is not subject to regulation by the U.S. Nuclear Regulatory Commission (NRC), shall register such radiation installation with the Department of Nuclear Safety (Department). The operator shall register the installation before the installation is placed in operation on a form prescribed by the Department which shall include:
 - A) The operator's name;
 - B) The location and confines of the radiation installation; and
 - C) The type, strength and number of sources of radiation expected to be produced, used, operated, stored or disposed.
- 2) When the number of sources exceeds 50, the Director will, upon request of the operator, permit blanket registration of the installation. This blanket registration shall be on a form prescribed by the Department and shall include:
 - A) The operator's name;

- B) The location and confines of the radiation installation;
- C) A description of each type and range of strengths of each type of source of radiation;
- D) The number of each type of source;
- E) The radionuclide in each type of source; and
- F) The specific information requested on form IL 473-0013 regarding registration of x-ray machines.

b) Machine Registration

- 1) Every operator of a radiation installation where radiation machines are located shall register such machines with the Department.
- 2) Installation operators shall register radiation machines annually on a form prescribed by the Department. An annual registration fee of \$10.00 per radiation machine for each machine possessed on January 1 of each year shall be submitted with the registration form. *The Department shall bill the operator for the registration fee as soon as practical after January 1. Registration fees shall be due and payable within 60 days after the date of billing. If after 60 days the registration fee is not paid the Department may issue an order directing the operator of the installation to cease use of the radiation machines for which the fee is outstanding or take other appropriate enforcement action as provided in Section 36 of the Radiation Protection Act of 1990 420 ILCS 40/36 . 420 ILCS 30/2.1*

(Source: Amended at 20 Ill. Reg. 6912, effective May 1, 1996)

Section 320.15 Incorporations by Reference

All rules, standards and guidelines of agencies of the United States or nationally recognized organizations or associations that are incorporated by reference in this Part are incorporated as of the date specified in the reference and do not include any later amendments or editions. Copies of these rules, standards and guidelines that have been incorporated by reference are available for public inspection at the Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, Illinois. Copies of the standards established by the National Council on Radiation Protection and Measurements (NCRP) can be obtained directly from NCRP Publication, 7910 Woodmont Avenue, Suite 800, Bethesda MD 20814.

(Source: Amended at 18 Ill. Reg. 3363, effective February 22, 1994)

Section 320.20 Amendments

- a) Installation registration, as specified in Section 320.10(a), shall be required only at the time the radiation installation is placed in operation unless there is a change in the number or strength of

sources or of the output of energy of radiation produced in or by the installation so registered. If there is any change(s), the operator shall register such change(s), other than change due to natural radioactive decay, with the Department. Amendments to installation registration shall be on a form prescribed by the Department and shall be submitted in accordance with the following schedule:

- 1) For any change(s) occurring between January 1 and June 30 of a given calendar year, the amended installation registration shall be filed with the Department between July 1 and July 31 of that calendar year.
 - 2) For any change(s) occurring between July 1 and December 31 of a given calendar year, the amended installation registration shall be filed with the Department between January 1 and January 31 of the following calendar year.
- b) Operators of installations which have been registered pursuant to Section 320.10(b) may amend that registration by blanket amendment on the form prescribed by the Department.

(Source: Amended at 14 Ill. Reg. 13644, effective August 13, 1990)

Section 320.30 Discontinued Use

If any operator discontinues using radiation machines or producing, transporting, storing, using or disposing of radioactive material, the operator shall notify the Department within 30 days after such discontinuance. The notification shall include the date of discontinuance and the disposition of such radiation machines or radioactive material.

(Source: Amended at 18 Ill. Reg. 3363, effective February 22, 1994)

Section 320.40 Exemptions

An operator shall be exempt from these installation and machine registration requirements in accordance with Section 3 of the Radiation Installation Act (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 196) 420 ILCS 30/3 (the Act) for the following material machines and uses:

- a) *Natural radioactive materials of an equivalent specific radioactivity not exceeding that of natural potassium, except when such materials are produced, stored, used, handled or disposed in such quantity or fashion that any person might receive within a week a radiation dose exceeding one-tenth the maximum permissible total weekly dose for any critical organ exposed, as determined by the standards established by the National Committee on Radiation Protection.* (See Section 3(a).)

AGENCY NOTE: The name of the National Committee on Radiation Protection has been changed to the National Council on Radiation Protection and Measurements.

b) *For radioactive materials not in sealed sources in quantities less than or equal to those identified in the following table: (See Section 3(b).)*

Radioactive Material	Upper Limit Kilobecquerel	Upper Limit Micro- Curie	Radioactive Material	Upper Limit Kilobecquerel	Upper Limit Micro- Curie
Pb(210)	37	1	Po(210)	37	1
At(211)	37	1	Ra(266)	37	1
Ac(227)	37	1	U(233)	37	1
Pu(239)	37	1	Am(241)	37	1
Cm(242)	37	1	Sc(46)	370	10
Co(60)	370	10	Sr(90)	370	10
Ag(105)	370	10	Ru(106)	370	10
Te(129)	370	10	I(131)	370	10
Cs(137)	370	10	Ce(144)	370	10
Eu(154)	370	10	W(181)	370	10
Re(183)	370	10	Ir(192)	370	10
P(32)	3,700	100	Cl(36)	3,700	100
Ca(45)	3,700	100	Sc(47)	3,700	100
Sc(48)	3,700	100	V(48)	3,700	100
Fe(59)	3,700	100	Zn(65)	3,700	100
Ga(72)	3,700	100	As(76)	3,700	100
Rb(86)	3,700	100	Sr(89)	3,700	100
Y(91)	3,700	100	Nb(95)	3,700	100
Tc(96)	3,700	100	Rh(105)	3,700	100
Cd(109)	3,700	100	Ag(111)	3,700	100
Sn(113)	3,700	100	Te(127)	3,700	100
Ba(140)	3,700	100	La(140)	3,700	100
Pr(143)	3,700	100	Sm(151)	3,700	100
Ho(166)	3,700	100	Ta(170)	3,700	100
Lu(177)	3,700	100	Tm(182)	3,700	100
Pt(191)	3,700	100	Pt(193)	3,700	100
Au(198)	3,700	100	Au(199)	3,700	100
Tl(200)	3,700	100	Tl(204)	3,700	100
Pb(203)	3,700	100	Th(234)	3,700	100
H(3)	37,000	1,000	Be(7)	37,000	1,000
C(14)	37,000	1,000	Na(24)	37,000	1,000
S(35)	37,000	1,000	K(42)	37,000	1,000
Cr(51)	37,000	1,000	Fe(55)	37,000	1,000
Mn(56)	37,000	1,000	Ni(59)	37,000	1,000
Cu(64)	37,000	1,000	Ge(71)	37,000	1,000
Mo(99)	37,000	1,000	Pd(103)	37,000	1,000
Pm(147)	37,000	1,000	Ir(190)	37,000	1,000
Au(196)	37,000	1,000	Tl(201)	37,000	1,000
Tl(202)	37,000	1,000	Natural U	37,000	1,000
Natural Th	37,000	1,000			

- c) *Radioactive materials in sealed sources in total quantities not exceeding 37 MBq (one millicurie) for a given installation. (See Section 3(c).)*
- d) *Timepieces, instruments, novelties, or devices containing self-luminous elements, except during the manufacture of the self-luminous elements and the production of said timepieces, instruments, novelties and except when the timepieces, instruments, novelties, or devices are stored, used, repaired, handled, or disposed in such quantity or fashion that any person might receive within a week a radiation dose exceeding one-tenth the maximum permissible total weekly dose for any critical organ exposed, as determined by the standards established by the National Committee on Radiation Protection. (See Section 3(d).)*

AGENCY NOTE: The name of the National Committee on Radiation Protection has been changed to the National Council on Radiation Protection and Measurements.

- e) *Electrical equipment that is manufactured for purposes other than generation of radiation, where the generation of radiation is incidental to operation (such as a television), and that operates in such a manner that no person may receive within a week a radiation dose exceeding one-tenth the maximum permissible total weekly dose for any critical organ exposed. Determinations of doses shall be made in accordance with the standards established by the National Committee of Radiation Protection. The production testing or production servicing of all such electrical equipment shall not be exempt from registration. (See Section 3(e).)*

AGENCY NOTE: The name of the National Committee on Radiation Protection has been changed to the National Council on Radiation Protection and Measurements.

- f) *Any radioactive material or radiation machine being transported on vessels, aircraft, railroad cars, or motor vehicles in conformity with regulations adopted by any agency having jurisdiction over safety during transportation. (See Section 3(f).)*
 - g) *Radiation machines, radioactive materials, and radiation installations which the Department of Nuclear Safety finds to be without radiation hazard, as determined by the standards established by the National Committee on Radiation Protection. (See Section 3(g).)*
- AGENCY NOTE: The name of the National Committee on Radiation Protection has been changed to the National Council on Radiation Protection and Measurements.

(Source: Amended at 18 Ill. Reg. 3363, effective February 22, 1994)

such installation with the Department. The Department shall report any such operator to the Attorney General for enforcement action.

(Source: Added at 10 Ill. Reg. 17529, effective September 25, 1986)

Section 320.50 Noncompliance

It shall be unlawful for any operator to engage in business or activities within a radiation installation without registering

TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

PART 330
LICENSING OF RADIOACTIVE MATERIAL

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330.1000	Transportation of Radioactive Materials (Repealed)

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APPENDIX G	Financial Surety Arrangements (Section 330.250(c)(1)(D))
APPENDIX H	Wording of Financial Surety Arrangements (Section 330.250(c)(1)(E))

AUTHORITY: Implementing and authorized by the Radiation Protection Act of 1990 (Ill. Rev. Stat. 1991, ch. 111 1/2, pars. 210-1 et seq.) 420 ILCS 40 .

SOURCE: Filed April 20, 1974, by the Department of Public Health; transferred to the Department of Nuclear Safety by P.A. 81-1516, effective December 3, 1980; amended at 5 Ill. Reg. 9586, effective September 10, 1981; codified at 7 Ill. Reg. 17492; recodified at 10 Ill. Reg. 11268; amended at 10 Ill. Reg. 17315, effective September 25, 1986; amended at 15 Ill. Reg. 10632, effective July 15, 1991; amended at 18 Ill. Reg. 5553, effective March 29, 1994.

NOTE: In this Part, superscript numbers or letters are denoted by parentheses; subscript are denoted by brackets.

SUBPART A: GENERAL PROVISIONS

Section 330.10 Purpose and Scope

- a) This Part provides for the licensing of radioactive material. No person shall receive, possess, utilize, manufacture, distribute, transfer, own or acquire radioactive material or devices or equipment utilizing or producing such materials except as authorized in a specific or general license issued pursuant to this Part or as otherwise provided in this Part.
- b) In addition to the requirements of subsection (a) above, all licensees are subject to the requirements of this Part and 32 Ill. Adm Code 310, 320, 331, 340, 341 and 400. Licensees engaged in source material milling or possessing byproduct material as defined in Section 4(a)(2) of the Radiation Protection Act of 1990 (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 210-1 et seq.) 420 ILCS 40/4(a)(2) , are also subject to the requirements of 32 Ill. Adm. Code 332. Licensees engaged in industrial radiographic operations are also subject to the requirements of 32 Ill. Adm Code 350. Licensees using radioactive material in the healing arts are also subject to the requirements of 32 Ill. Adm Code 335. Licensees engaged in wireline and subsurface tracer studies are also subject to the requirements of 32 Ill. Adm Code 351. The requirements of this Part do not apply to carriers. Carriers are subject to the requirements of 32 Ill. Adm. Code 341.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.15 Incorporations by Reference

All rules, standards and guidelines of agencies of the United States or nationally recognized organizations or associations that are incorporated by reference in this Part are incorporated as of the date specified in the reference and do not include any later amendments or editions. Copies of these rules, standards and guidelines that have been incorporated by reference are available for public inspection at the Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, Illinois.

(Source: Added at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.30 License Exemption - Source Material

- a) Any person is exempt from this Part to the extent that such person receives, possesses, uses, owns or transfers source material in any chemical mixture, compound, solution or alloy in which the source material is by weight less than one-twentieth of one percent (0.05 percent) of the mixture, compound, solution or alloy.
- b) Any person is exempt from this Part to the extent that such person receives, possesses, uses or transfers unrefined and unprocessed ore containing source material; provided that, except as authorized in a specific license, such person shall not refine or process such ore.
- c) Any person is exempt from this Part to the extent that such person receives, possesses, uses or transfers:
 - 1) Any quantities of thorium contained in:
 - A) Incandescent gas mantles;
 - B) Vacuum tubes;
 - C) Welding rods;
 - D) Electric lamps for illuminating purposes provided that each lamp does not contain more than 50 milligrams of thorium;
 - E) Germicidal lamps, sunlamps and lamps for outdoor or industrial lighting provided that each lamp does not contain more than 2 grams of thorium;
 - F) Rare earth metals and compounds, mixtures and products containing not more than 0.25 percent by weight thorium, uranium or any combination of these; or
 - G) Personnel neutron dosimeters, provided that each dosimeter does not contain more than 50 milligrams of thorium.
 - 2) Source material contained in the following products:
 - A) Glazed ceramic tableware, provided that the glaze contains not more than 20 percent by weight source material;
 - B) Piezoelectric ceramic containing not more than two percent by weight source material;
 - C) Glassware containing not more than ten percent by weight source material, but not including commercially manufactured glass brick, pane glass, ceramic tile or other glass or ceramic used in construction; and
 - D) Glass enamel or glass enamel frit containing not more than ten percent by weight source material imported or ordered for importation into the United States, or initially distributed by manufacturers in the United States, before July 25, 1983.
 - 3) Photographic film, negatives and prints containing uranium or thorium.
 - 4) Any finished product or part fabricated of, or containing, tungsten-thorium or magnesium-thorium alloys, provided that the thorium content of the alloy does not exceed four percent by weight and that this exemption shall not be deemed to authorize the chemical, physical, or metallurgical treatment or processing of any such product or part.
 - 5) Uranium contained in counterweights installed in aircraft, rockets, projectiles and missiles, or stored or handled in connection with installation or removal of such counterweights, provided that:
 - A) The counterweights are manufactured in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission or

the Atomic Energy Commission authorizing distribution by the licensee pursuant to 10 CFR 40.13(c)(5)(i), as in effect on June 30, 1969, exclusive of subsequent amendments or editions;

- B) Each counterweight has been impressed with the following legend clearly legible through any plating or other covering: "DEPLETED URANIUM";
 AGENCY NOTE: The requirement specified in subsection (c)(5) (B) above does not need to be met by counterweights manufactured prior to December 31, 1969; provided that such counterweights were manufactured under a specific license issued by the Atomic Energy Commission and were impressed with the legend, "CAUTION - RADIOACTIVE MATERIAL - URANIUM", as previously required by 10 CFR 40.13(c)(5)(ii), as in effect on June 30, 1969, exclusive of subsequent amendments or editions.
- C) Each counterweight is durably and legibly labeled or marked with the identification of the manufacturer and the statement: "UNAUTHORIZED ALTERATIONS PROHIBITED"; and
 AGENCY NOTE: The requirement specified in subsection (c)(5)(C) above does not need to be met by counterweights manufactured prior to December 31, 1969; provided that such counterweights were manufactured under a specific license issued by the Atomic Energy Commission and were impressed with the legend, "CAUTION - RADIOACTIVE MATERIAL - URANIUM", as previously required by 10 CFR 40.13(c)(5)(ii), as in effect on June 30, 1969, exclusive of subsequent amendments or editions.
- D) This exemption shall not be deemed to authorize the chemical, physical or metallurgical treatment or processing of any such counterweights other than repair or restoration of any plating or covering.
- 6) Natural or depleted uranium metal used as shielding constituting part of any shipping container, provided that:
 - A) The shipping container is conspicuously and legibly impressed with the legend, "CAUTION - RADIOACTIVE SHIELDING- URANIUM"; and
 - B) The uranium metal is encased in mild steel or equally fire resistant metal of minimum wall thickness of 3.2 millimeters (1/8 inch).
- 7) Thorium contained in finished optical lenses, provided that each lens does not contain more than 30 percent by weight of thorium and that this exemption shall not be deemed to authorize either:
 - A) The shaping, grinding or polishing of such lens or manufacturing processes other than the assembly of such lens into optical systems and devices without any alteration of the lens; or
 - B) The receipt, possession, use or transfer of thorium contained in contact lenses, or in spectacles, or in eyepieces in binoculars or other optical instruments.

- 8) Uranium contained in detector heads for use in fire detection units, provided that each detector head contains not more than 185 Bq (5 nCi) of uranium; or
- 9) Thorium contained in any finished aircraft engine part containing nickel-thoria alloy, provided that:
 - A) The thorium is dispersed in the nickel-thoria alloy in the form of finely divided thoria (thorium dioxide); and
 - B) The thorium content in the nickel-thoria alloy does not exceed four percent by weight.
- d) The exemptions in subsection (c) above do not authorize the manufacture of any of the products described.
- e) Any licensee is exempt from the requirements of this Part to the extent that its activities are subject to the requirements of 32 Ill. Adm. Code 601, except as specifically provided for in 32 Ill. Adm. Code 601.

(Source: Amended at 18 Ill. Reg. 5553, effective 1 March 29, 1994)

Section 330.40 License Exemption - Radioactive Materials Other Than Source Material

a) Exempt Concentrations

- 1) Any person is exempt from this Part to the extent that such person receives, possesses, uses, transfers, owns or acquires products containing radioactive material introduced in concentrations not in excess of those listed in Section 330. Appendix A provided they have been distributed pursuant to a license as described in subsection (a)(2) below. This Section shall not be deemed to authorize the import of radioactive materials or products containing radioactive materials.
- 2) No person may introduce radioactive material into a product or material knowing or having reason to believe that it will be transferred to persons exempt under subsection (1) above or equivalent regulations of the U.S. Nuclear Regulatory Commission (10 CFR 30.14), an Agreement State or a Licensing State, except in accordance with a specific license issued pursuant to Section 330.280(a) or the general license provided in Section 330.900.

b) Exempt Quantities

- 1) Any person is exempt from this Part to the extent that such person receives, possesses, uses, transfers, owns or acquires radioactive material in individual quantities each of which does not exceed the applicable quantity set forth in Section 330. Appendix B provided they have been distributed pursuant to a license as described in subsection (3) below.
- 2) This subsection (b) does not authorize the production, packaging or repackaging of radioactive material for purposes of commercial distribution, or the incorporation of radioactive material into products intended for commercial distribution.
- 3) No person may, for purposes of commercial distribution, transfer radioactive material in the individual quantities set forth in Section 330. Appendix B, knowing or having reason to believe that such quantities of radioactive material will be transferred to persons exempt under this subsection (b) or equivalent regulations of the U.S. Nuclear Regulatory Commission, an Agreement

State or a Licensing State, except in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.18 or by the Department pursuant to Section 330.280(b), which states that the radioactive material may be transferred by the licensee to persons exempt under subsection (b) or the equivalent regulations of the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State.

AGENCY NOTE: Authority to transfer possession or control by the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing byproduct material whose subsequent possession, use, transfer and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

c) Exempt Items

- 1) Certain Items Containing Radioactive Material. Except for persons who apply radioactive material to, or persons who incorporate radioactive material into the following products or persons who initially transfer for sale or distribution the following products, any person is exempt from this Part to the extent that he receives, possesses, uses, transfers, owns or acquires the following products:

*AGENCY NOTE: Authority to transfer possession or control by the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing byproduct material whose subsequent possession, use, transfer and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

- A) Timepieces or hands or dials containing not more than the following specified quantities of radioactive material and not exceeding the following specified radiation dose rate:
 - i) 925 MBq (25 mCi) of tritium per timepiece;
 - ii) 185 MBq (5 mCi) of tritium per hand;
 - iii) 555 MBq (15 mCi) of tritium per dial (bezels when used shall be considered as part of the dial);
 - iv) 3.7 MBq (100 microCi) of promethium-147 per watch or 7.4 MBq (200 microCi) of promethium-147 per any other timepiece;
 - v) 740 kBq (20 microCi) of promethium-147 per watch hand or 1.48 MBq (40 microCi) of promethium-147 per other timepiece hand;
 - vi) 2.22 MBq (60 microCi) of promethium-147 per watch dial or 4.44 MBq (120 microCi) of promethium-147 per other timepiece dial (bezels when used shall be considered as part of the dial);
 - vii) The radiation dose rate from hands and dials containing promethium-147 will not exceed, when measured through 50 milligrams per square

- centimeter of absorber: for wrist watches, 1 uGy (100 microrad) per hour at 10 centimeters from any surface; for pocket watches, 1 uGy (100 microrad) per hour at 1 centimeter from any surface; for any other timepiece, 2 uGy (200 microrad) per hour at 10 centimeters from any surface; or
- viii) 37 kBq (1 microCi) of radium-226 per timepiece in timepieces acquired prior to May 1, 1974.
- B) Lock illuminators containing not more than 555 MBq (15 mCi) of tritium or not more than 74 MBq (2 mCi) of promethium-147 installed in automobile locks. The radiation dose rate from each lock illuminator containing promethium-147 will not exceed 10 uGy (1 mrad) per hour at 1 centimeter from any surface when measured through 50 milligrams per square centimeter of absorber.
- C) Precision balances containing not more than 37 MBq (1 mCi) of tritium per balance or not more than 18.5 MBq (500 microCi) of tritium per balance part.
- D) Automobile shift quadrants containing not more than 925 MBq (25 mCi) of tritium.
- E) Marine compasses containing not more than 27.8 GBq (750 mCi) of tritium gas and other marine navigational instruments containing not more than 9.25 GBq (250 mCi) of tritium gas.
- F) Thermostat dials and pointers containing not more than 925 MBq (25 mCi) of tritium per thermostat.
- G) Electron tubes; provided that each tube does not contain more than one of the following specified quantities of radioactive material:
- 5.55 GBq (150 mCi) of tritium per microwave receiver protector tube or 370 MBq (10 mCi) of tritium per any other electron tube;
 - 37 kBq (1 microCi) of cobalt-60;
 - 185 kBq (5 microCi) of nickel-63;
 - 1.11 MBq (30 microCi) of krypton-85;
 - 185 kBq (5 microCi) of cesium-137; or
 - 1.11 MBq (30 microCi) of promethium-147;
- and provided further, that the radiation dose rate from each electron tube containing radioactive material will not exceed 10 uGy (1 mrad) per hour at 1 centimeter from any surface when measured through 7 milligrams per square centimeter of absorber.
- AGENCY NOTE: For purposes of subsection (c)(1)(G) above, "electron tubes" include spark gap tubes, power tubes, gas tubes including glow lamps, receiving tubes, microwave tubes, indicator tubes, pick-up tubes, radiation detection tubes and any other completely sealed tube that is designed to conduct or control electrical currents.
- H) Ionizing radiation measuring instruments containing, for purposes of internal calibration or standardization, one or more

sources of radioactive material, provided that:

- Each source contains no more than one exempt quantity set forth in Section 330. Appendix B; and
- Each instrument contains no more than ten exempt quantities. For purposes of this requirement, an instrument's source(s) may contain one or more radionuclides and an individual exempt quantity may be composed of fractional parts of one or more of the exempt quantities in Section 330. Appendix B, provided that the sum of such fractions shall not exceed unity.

AGENCY NOTE: For purposes of subsection (c)(1)(H) above, 1.85 kBq (50 nCi) of americium-241 is considered an exempt quantity.

- Spark gap irradiators containing not more than 37 kBq (1 microCi) of cobalt-60 per spark gap irradiator for use in electrically-ignited fuel oil burners having a firing rate of at least 11.4 liters (3 gallons) per hour.
- 2) Self-Luminous Products Containing Radioactive Material
- Tritium, Krypton-85 or Promethium-147. Except for persons who manufacture, process or produce self-luminous products containing tritium, krypton-85 or promethium-147, any person is exempt from this Part to the extent that such person receives, possesses, uses, transfers, owns or acquires tritium, krypton-85 or promethium-147 in self-luminous products manufactured, processed, produced, imported or transferred in accordance with a specific license, issued by the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.22, which authorizes the transfer of the product to persons who are exempt from regulatory requirements. The exemption in this subsection does not apply to tritium, krypton-85 or promethium-147 used in products for frivolous purposes or in toys or adornments. The U. S. Nuclear Regulatory Commission shall make this determination of exemption.
 - Radium-226. Any person is exempt from this Part to the extent that such person receives, possesses, uses, transfers or owns articles containing less than 3.7 kBq (100 nCi) of radium-226 which were acquired prior to May 1, 1974.
- 3) Gas and Aerosol Detectors Containing Radioactive Material
- Except for persons who manufacture, process, produce or initially transfer for sale and distribution gas and aerosol detectors containing radioactive material, any person is exempt from 32 Ill. Adm. Code: Chapter II, Subchapters b and d to the extent that such person receives, possesses, uses, transfers, owns or acquires radioactive material in gas and aerosol detectors designed to protect life or property from fires and airborne hazards provided that detectors containing radioactive material shall have been manufactured, imported or

initially transferred in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.26 or a Licensing State pursuant to Section 330.280(c), which authorizes the transfer of the detectors to persons who are exempt from regulatory requirements.

AGENCY NOTE: Authority to transfer possession or control by the manufacturer, processor or producer of any equipment, device, commodity or other product containing byproduct material whose subsequent possession, use, transfer and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

- B) Gas and aerosol detectors previously manufactured and distributed to general licensees in accordance with a specific license issued by an Agreement State shall be considered exempt under subsection (c)(3)(A) above, provided that the device is labeled in accordance with the specific license authorizing distribution of the generally licensed device and provided further that they meet the requirements of Section 330.280(c).
- C) Gas and aerosol detectors containing naturally-occurring or accelerator-produced radioactive material (NARM) previously manufactured and distributed in accordance with a specific license issued by a Licensing State shall be considered exempt under subsection (c)(3)(A) above, provided that the device is labeled in accordance with the specific license authorizing distribution and provided further that they meet the requirements of Section 330.280(c).
- 4) Resins Containing Scandium-46 and Designed for Sand Consolidation in Oil Wells. Any person is exempt from this Part to the extent that such person receives, possesses, uses, transfers, owns or acquires synthetic plastic resins containing scandium-46 which are designed for sand consolidation in oil wells. Such resins shall have been manufactured or imported in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission, or shall have been manufactured in accordance with the specifications contained in a specific license issued by the Department or an Agreement State to the manufacturer of such resins pursuant to licensing requirements equivalent to those in 10 CFR 32.17 published January 1, 1993, exclusive of subsequent amendments or editions. This exemption does not authorize the manufacture of any resins containing scandium-46.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

SUBPART B: TYPES OF LICENSES

Section 330.200 Types of Licenses

Licenses for radioactive materials are of two types: general and specific.

- a) "General license" means a license, as set forth in this Part and 32 Ill. Adm. Code 341, which is effective without the filing of an application to transfer, acquire, own, possess or use quantities of, or devices or equipment utilizing, radioactive material (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 210-4(d)) 420 ILCS 40/4(d), although the filing of a certificate with the Department may be required by the particular general license. The general licensee is subject to all other applicable portions of 32 Ill. Adm. Code: Chapter II and any limitations of the general license.
- b) "Specific license" means a license, issued after application, to use, manufacture, produce, transfer, receive, acquire, own, or possess quantities of, or devices or equipment utilizing radioactive materials (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 210-4(m)) 420 ILCS 40/4(m). The licensee is subject to all applicable portions of 32 Ill. Adm. Code: Chapter II as well as any limitations specified in the licensing document.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.210 General Licenses - Source Material

- a) A general license is hereby issued authorizing commercial and industrial firms, research, educational and medical institutions, and State and local government agencies to use and transfer not more than 6.82 kilograms (15 pounds) of source material at any one time for research, development, educational, commercial or operational purposes. A person authorized to use or transfer source material, pursuant to this general license, may not receive more than a total of 68.2 kilograms (150 pounds) of source material in any 1 calendar year.
- b) Persons who receive, possess, use or transfer source material pursuant to the general license issued in subsection (a) above are exempt from the provisions of 32 Ill. Adm. Code 340 and 400 to the extent that such receipt, possession, use or transfer is within the terms of such general license; provided, however, that this exemption shall not be deemed to apply to any such person who is also in possession of source material under a specific license issued pursuant to this Part.
- c) A general license is hereby issued authorizing the receipt of title to source material without regard to quantity. This general license does not authorize any person to receive, possess, use or transfer source material.
- d) Depleted Uranium in Industrial Products and Devices
 - 1) A general license is hereby issued to receive, acquire, possess, use or transfer, in accordance with the provisions of subsections (d)(2) through (5) below, depleted uranium contained in industrial products or devices for the purpose of providing a concentrated mass in a small volume of the product or device.
 - 2) The general license in subsection (d)(1) above applies only to industrial products or devices which have been manufactured either in accordance with a specific license issued to the manufacturer of the products or devices pursuant to Section 330.280 (l) or in accordance with a specific license issued to the manufacturer by the U.S. Nuclear Regulatory Commission or an Agreement State which authorizes manufacture of the products or devices for distribution to persons generally licensed by the U.S. Nuclear Regulatory Commission or an Agreement State.

- 3) Persons who receive, acquire, possess or use depleted uranium pursuant to the general license established by subsection (d)(1) above shall:

A) File the form, "Registration Certificate - Use of Depleted Uranium Under General License," with the Department. The form shall be submitted within 30 days after the first receipt or acquisition of such depleted uranium. The registrant shall furnish on the form "Registration Certificate - Use of Depleted Uranium Under General License," the following information:

- i) Name and address of the registrant;
- ii) A statement that the registrant has developed and will maintain procedures designed to establish physical control over the depleted uranium described in subsection (d)(1) above and designed to prevent transfer of such depleted uranium in any form, including metal scrap, to persons not authorized to receive the depleted uranium; and
- iii) Name and/or title, address and telephone number of the individual duly authorized to act for and on behalf of the registrant in supervising the procedures identified in subsection (d)(3)(A)(ii) above.

B) Report in writing to the Department any changes in information furnished by him in the form, "Registration Certificate - Use of Depleted Uranium Under General License." The report shall be submitted within 30 days after the effective date of such change.

- 4) A person who receives, acquires, possesses or uses depleted uranium pursuant to the general license established by subsection (d)(1) above:

- A) Shall not introduce such depleted uranium, in any form, into a chemical, physical or metallurgical treatment or process, except a treatment or process for repair or restoration of any plating or other covering of the depleted uranium;
- B) Shall not abandon such depleted uranium;
- C) Shall transfer or dispose of such depleted uranium only by transfer in accordance with the provisions of Section 330.400. In the case where the transferee receives the depleted uranium pursuant to the general license established by subsection (d) (1) above, the transferor shall furnish the transferee a copy of this Part and a copy of the form, "Registration Certificate - Use of Depleted Uranium Under General License". In the case where the transferee receives the depleted uranium pursuant to a general license contained in the U.S. Nuclear Regulatory Commission's regulation 10 CFR 40.25(a) or Agreement State's regulation equivalent to subsection(d)(1) above, the transferor shall furnish the transferee a copy of this Part and a copy of the form, "Registration Certificate - Use of Depleted Uranium Under General License", accompanied by a note explaining that use of the product or device is regulated by the

U.S. Nuclear Regulatory Commission or Agreement State under requirements substantially the same as those in this Part;

D) Within 30 days of any transfer, shall report in writing to the Department the name and address of the person receiving the depleted uranium pursuant to such transfer; and

E) Shall not export such depleted uranium except in accordance with a license issued by the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 110.

- 5) Any person receiving, acquiring, possessing, using or transferring depleted uranium pursuant to the general license established by subsection (d)(1) above is exempt from the requirements of 32 Ill. Adm. Code 340 and 400 with respect to the depleted uranium covered by that general license.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.220 General Licenses - Radioactive Material Other Than Source Material

- a) Certain Devices and Equipment. A general license is hereby issued to transfer, receive, acquire, own, possess and use radioactive material incorporated in the following devices or equipment which have been manufactured, tested and labeled by the manufacturer in accordance with a specific license issued to the manufacturer by the U.S. Nuclear Regulatory Commission for use pursuant to 10 CFR 31.3. This general license is subject to the provisions of 32 Ill. Adm. Code 310.40 through 310.90, 340, 341, 400 and Sections 330.40(a)(2), 330.310, 330.400 and 330.500 of this Part.

AGENCY NOTE: Attention is directed particularly to the provisions of 32 Ill. Adm. Code 340 which relate to the labeling of containers.

- 1) Static Elimination Device. Devices designed for use as static eliminators which contain, as a sealed source or sources, radioactive material consisting of a total of not more than 18.5 MBq (500 microCi) of polonium-210 per device.
- 2) Ion Generating Tube. Devices designed for ionization of air which contain, as a sealed source or sources, radioactive material consisting of a total of not more than 18.5 MBq (500 microCi) of polonium-210 per device or a total of not more than 1.85 GBq (50 mCi) of hydrogen-3 (tritium) per device.

- b) Certain Measuring, Gauging or Controlling Devices

- 1) A general license is hereby issued to commercial and industrial firms and to research, educational and medical institutions, individuals in the conduct of their business and State or local government agencies to own, receive, acquire, possess, use or transfer in accordance with the provisions of subsections (b)(2) through (4) below, radioactive material, excluding special nuclear material, contained in devices designed and manufactured for the purpose of detecting, measuring, gauging or controlling thickness, density, level, interface location, radiation, leakage, or qualitative or quantitative chemical composition, or for producing light or an ionized atmosphere.
- 2) The general license in subsection (b)(1) above applies only to radioactive material contained in devices which have been manufactured and labeled in accordance with the specifications contained in

a specific license issued by the Department pursuant to Section 330.280(d) or in accordance with the specifications contained in a specific license issued by the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State, which authorizes distribution of devices to persons generally licensed by the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State.

AGENCY NOTE: Regulations under the Federal Food, Drug and Cosmetic Act authorizing the use of radioactive control devices in food production require certain additional labeling thereon which is found in 21 CFR 179.21.

- 3) Any person who owns, receives, acquires, possesses, uses or transfers radioactive material in a device pursuant to the general license in subsection (b)(1) above:
- A) Shall assure that all labels affixed to the device at the time of receipt, and bearing a statement that removal of the label is prohibited, are maintained thereon and shall comply with all instructions and precautions provided by such labels;
 - B) Shall assure that the device is tested for leakage of, or contamination by, radioactive material and proper operation of the on-off mechanism and indicator, if any, at no longer than 6-month intervals or at such other intervals as are specified in the label; however,
 - i) Devices containing only krypton need not be tested for leakage of, or contamination by, radioactive material; and
 - ii) Devices containing only tritium or not more than 3.7 MBq (100 microCi) of other beta and/or gamma emitting material or 370 kBq (10 microCi) of alpha emitting material and devices held in storage in the original shipping container prior to initial installation need not be tested for any purpose;
 - C) Shall assure that (including testing required by subsection (b)(3)(B) above), installation, servicing and removal from installation involving the radioactive material, its shielding or containment, are performed:
 - i) In accordance with the instructions provided by the labels; or
 - ii) By a person holding an applicable specific license from the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State to perform such activities;
 - D) Shall maintain records showing compliance with the requirements of subsections (b)(3)(B) and (C) above. The records shall show the results of tests concerning the installation, testing for leakage or contamination, servicing and removal of radioactive material, its shielding or containment. The records also shall show the dates of performance of and the names of persons performing these tests. Records of tests for leakage of, or contamination by, radioactive material required by subsection

(b)(3)(B) above shall be maintained for 1 year after the next required test for leakage or contamination is performed or until the sealed source is transferred or disposed of. Records of tests of the on-off mechanism and indicator required by subsection (b)(3)(B) above shall be maintained for 1 year after the next required test of the on-off mechanism and indicator is performed or until the sealed source is transferred or disposed of. Records which are required by subsection (b)(3)(C) above, other than records of tests for leakage of, or contamination by, radioactive material, shall be maintained for a period of 2 years from the date of the recorded event or until the device is transferred or disposed of;

- E) Upon the occurrence of a failure of or damage to, or any indication of a possible failure of or damage to, the shielding of the radioactive material or the on-off mechanism or indicator, or upon the detection of 185 Bq (5 nCi) or more removable radioactive material, shall immediately suspend operation of the device until it has been repaired by the manufacturer or other person holding an applicable specific license from the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State to repair such devices, or disposed of by transfer to a person authorized by an applicable specific license to receive the radioactive material contained in the device and, within 30 days, furnish to the Department a report containing a brief description of the event and the remedial action taken;
- F) Shall not abandon the device containing radioactive material;
- G) Except as provided in subsection (b)(3)(H) below, shall transfer or dispose of the device containing radioactive material only by transfer to a specific licensee of the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State whose specific license authorizes him to receive the device and within 30 days after transfer of a device to a specific licensee shall furnish to the Department a report containing identification of the device by manufacturer's name and model number and the name and address of the person receiving the device. No report is required if the device is transferred to the specific licensee in order to obtain a replacement device;
- H) Shall transfer the device to another general licensee only:
 - i) Where the device remains in use at a particular location. In such case the transferor shall give the transferee a copy of subsection (b) and any safety documents identified in the label on the device and within 30 days of the transfer, report to the Department the manufacturer's name and model number of device transferred, the name and address of the transferee and the name and/or

- position of an individual who may constitute a point of contact between the Department and the transferee; or
- ii) Where the device is held in storage in the original shipping container at its intended location of use prior to initial use by a general licensee;
- I) Shall comply with the provisions of 32 Ill. Adm. Code 340.1210, 340.1220 and 340.1260 for reporting radiation incidents, theft, loss, leakage of, or contamination by, licensed material, but shall be exempt from the other requirements of 32 Ill. Adm. Code 340 and 400.
- 4) The general license in subsection (b)(1) above does not authorize the manufacture of devices containing radioactive material.
 - 5) The general license provided in subsection (b)(1) above is subject to the provisions of 32 Ill. Adm. Code 310.40 through 310.90, 341 and Sections 330.310, 330.400 and 330.500 of this Part.
- c) Luminous Safety Devices for Aircraft
- 1) A general license is hereby issued to own, receive, acquire, possess and use tritium or promethium-147 contained in luminous safety devices for use in aircraft, provided:
 - A) Each device contains not more than 370 GBq (10 Ci) of tritium or 11.1 GBq (300 mCi) of promethium-147; and
 - B) Each device has been manufactured, assembled or imported in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission, or each device has been manufactured or assembled in accordance with the specifications contained in a specific license issued by the Department or an Agreement State to the manufacturer or assembler of such device pursuant to licensing requirements equivalent to those in 10 CFR 32.53 published January 1, 1993, exclusive of subsequent amendments or editions.
 - 2) Persons who own, receive, acquire, possess or use luminous safety devices pursuant to the general license in subsection (c)(1) above are exempt from the requirements of 32 Ill. Adm. Code 340 and 400, except that they shall comply with the provisions of 32 Ill. Adm. Code 340.1210 and 340.1220.
 - 3) This general license does not authorize the manufacture, assembly or repair of luminous safety devices containing tritium or promethium-147.
 - 4) This general license does not authorize the ownership, receipt, acquisition, possession or use of promethium-147 contained in instrument dials.
 - 5) This general license is subject to the provisions of 32 Ill. Adm. Code 310.40 through 310.90, 341 and Sections 330.310, 330.400 and 330.500 of this Part.
- d) Ownership of Radioactive Material. A general license is hereby issued to own radioactive material without regard to quantity. Notwithstanding any other provisions of this Part, this general license does not authorize the manufacture, production, transfer, receipt, possession or use of radioactive material.
- e) Calibration and Reference Sources
- 1) A general license is hereby issued to those persons listed below to own, receive, acquire, possess, use and transfer, in accordance with the provisions of subsections (e)(4) and (5) below, americium-241 in the form of calibration or reference sources:
 - A) Any person who holds a specific license issued by the Department which authorizes him to receive, possess, use and transfer radioactive material; and
 - B) Any person who holds a specific license issued by the U.S. Nuclear Regulatory Commission which authorizes him to receive, possess, use and transfer special nuclear material.
 - 2) A general license is hereby issued to own, receive, possess, use and transfer plutonium in the form of calibration or reference sources in accordance with the provisions of subsections (e)(4) and (5) below to any person who holds a specific license issued by the Department which authorizes him to receive, possess, use and transfer radioactive material.
 - 3) A general license is hereby issued to own, receive, possess, use and transfer radium-226 in the form of calibration or reference sources in accordance with the provisions of subsections (e)(4) and (5) below to any person who holds a specific license issued by the Department which authorizes him to receive, possess, use and transfer radioactive material.
 - 4) The general licenses in subsections (e)(1) through (3) above apply only to calibration or reference sources which have been manufactured in accordance with the specifications contained in a specific license issued to the manufacturer or importer of the sources by the U.S. Nuclear Regulatory Commission pursuant to 10 CFR 32.57 or 70.39, or which have been manufactured in accordance with the specifications contained in a specific license issued by the Department, an Agreement State or a Licensing State pursuant to licensing requirements equivalent to those contained in 10 CFR 32.57 or 70.39, published January 1, 1993, exclusive of subsequent amendments or editions.
 - 5) The general licenses provided in subsections (e)(1) through (3) above are subject to the provisions of 32 Ill. Adm. Code 310.40 through 310.90, 340, 341, 400 and Sections 330.310, 330.400 and 330.500 of this Part. In addition, persons who own, receive, acquire, possess, use or transfer one or more calibration or reference sources pursuant to these general licenses:
 - A) Shall not possess at any one time, at any one location of storage or use, more than 185 kBq (5 microCi) of americium-241, 185 kBq (5 microCi) of plutonium or 185 kBq (5 microCi) of radium-226 in such sources;
 - B) Shall not receive, possess, use or transfer such source unless the source, or the storage container, bears a label which includes one of the following statements, as appropriate, or a statement which contains the information called for in one of the following statements, as appropriate:
 - i) The receipt, possession, use and transfer of this source, Model _____, Serial No. _____, are subject to a general license and the regulations of the U.S. Nuclear Regulatory Commission or of a state with which the Commission has entered into an agreement for the

exercise of regulatory authority. Do not remove this label.

CAUTION - RADIOACTIVE MATERIAL - THIS SOURCE CONTAINS (AMERICIUM-241) (PLUTONIUM). DO NOT TOUCH RADIOACTIVE PORTION OF THIS SOURCE.

Name of Manufacturer or Importer

AGENCY NOTE: Showing only the name of the appropriate material.

- ii) The receipt, possession, use and transfer of this source, Model ___, Serial No. ___, are subject to a general license and the regulations of a Licensing State. Do not remove this label.
- CAUTION - RADIOACTIVE MATERIAL - THIS SOURCE CONTAINS RADIUM-226. DO NOT TOUCH RADIOACTIVE PORTION OF THIS SOURCE.

Name of Manufacturer or Importer

- C) Shall not transfer, abandon or dispose of such source except by transfer to a person authorized by a license from the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State to receive the source;
- D) Shall store such source, except when the source is being used, in a closed container adequately designed and constructed to contain americium-241, plutonium, or radium-226 which might otherwise escape during storage; and
- E) Shall not use such source for any purpose other than the calibration of radiation detectors or the standardization of other sources.
- 6) These general licenses do not authorize the manufacture of calibration or reference sources containing americium-241, plutonium or radium-226.
- f) General License for Use of Radioactive Material for Certain In Vitro Clinical or Laboratory Testing
- AGENCY NOTE: The New Drug provisions of the Federal Food, Drug and Cosmetic Act also govern the availability and use of any specific diagnostic drugs in interstate commerce.
- 1) A general license is hereby issued to any physician, veterinarian, clinical laboratory or hospital to receive, acquire, possess, transfer or use, for any of the following stated tests, in accordance with the provisions of subsections (f)(2) through (6) below, the following radioactive materials in prepackaged units for use in in vitro clinical or laboratory tests not involving internal or external administration of radioactive material, or the radiation therefrom, to human beings or animals:
- A) Carbon-14, in units not exceeding 370 kBq (10 microCi) each.
- B) Cobalt-57, in units not exceeding 370 kBq (10 microCi) each.
- C) Hydrogen-3 (tritium), in units not exceeding 1.85 MBq (50 microCi) each.

- D) Iodine-125, in units not exceeding 370 kBq (10 microCi) each.
- E) Mock iodine-125 reference or calibration sources, in units not exceeding 1.85 kBq (50 nCi) of iodine-129 and 185 Bq (5 nCi) of americium-241 each.
- F) Iodine-131, in units not exceeding 370 kBq (10 microCi) each.
- G) Iron-59, in units not exceeding 740 kBq (20 microCi) each.
- H) Selenium-75, in units not exceeding 370 kBq (10 microCi) each.

- 2) No person shall receive, acquire, possess, use or transfer radioactive material pursuant to the general license established by subsection (f)(1) above until he has filed the Department form entitled "Certificate - In Vitro Testing with Radioactive Material Under General License," with the Department and received from the Department a validated copy of the form with certification number assigned. The following information shall be furnished to the Department on the form entitled "Certificate - In Vitro Testing with Radioactive Material Under General License":

- A) Name and address of the physician, veterinarian, clinical laboratory or hospital;
- B) The location of use; and
- C) A statement that the physician, veterinarian, clinical laboratory or hospital has appropriate radiation measuring instruments to carry out in vitro clinical or laboratory tests with radioactive material as authorized under the general license in subsection (f)(1) above and that such tests will be performed only by personnel competent in the use of such instruments and in the handling of the radioactive material.

- 3) A person who receives, acquires, possesses or uses radioactive material pursuant to the general license established by subsection (f)(1) above shall comply with the following:

- A) The general licensee shall not possess at any one time, pursuant to the general license in subsection (f)(1) above, at any one location of storage, or use a total amount of iodine-125, iodine-131, selenium-75, iron-59 and/or cobalt-57 in excess of 7.4 MBq (200 microCi).
- B) The general licensee shall store the radioactive material, until used, in the original shipping container or in a container providing equivalent radiation protection.
- C) The general licensee shall use the radioactive material only for the uses authorized by subsection (f)(1) above.
- D) The general licensee shall not transfer the radioactive material to a person who is not authorized to receive it pursuant to a license issued by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State, nor transfer the radioactive material in any manner other than in the unopened, labeled shipping container as received from the supplier.
- E) The general licensee shall dispose of the mock iodine-125 reference or calibration sources described in subsection (f)(1)(E) above as required by 32 Ill. Adm. Code 340.1010(a).

- 4) The general licensee shall not receive, acquire, possess or use radioactive material pursuant to subsection (f)(1) above:

A) Except as prepackaged units which are labeled in accordance with the provisions of an applicable specific license issued pursuant to Section 330.280(g) or in accordance with the provisions of a specific license issued by the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State which authorizes the manufacture and distribution of iodine-125, iodine-131, carbon-14, hydrogen-3 (tritium), iron-59, selenium-75, cobalt-57 or mock iodine-125 to persons generally licensed under subsection (f) or its equivalent; and

B) Unless one of the following statements, as appropriate, or a statement which contains the information called for in one of the following statements, appears on a label affixed to each prepackaged unit or appears in a leaflet or brochure which accompanies the package:

- i) This radioactive material shall be received, acquired, possessed and used only by physicians, veterinarians, clinical laboratories or hospitals and only for in vitro clinical or laboratory tests not involving internal or external administration of the material, or the radiation therefrom, to human beings or animals. Its receipt, acquisition, possession, use and transfer are subject to the regulations and a general license of the U.S. Nuclear Regulatory Commission or of a state with which the Commission has entered into an agreement for the exercise of regulatory authority.

Name of Manufacturer

- ii) This radioactive material shall be received, acquired, possessed and used only by physicians, veterinarians, clinical laboratories or hospitals and only for in vitro clinical or laboratory tests not involving internal or external administration of the material, or the radiation therefrom, to human beings or animals. Its receipt, acquisition, possession, use and transfer are subject to the regulations and a general license of a Licensing State.

Name of Manufacturer

- 5) The physician, veterinarian, clinical laboratory or hospital possessing or using radioactive material under the general license of subsection (f)(1) above shall report in writing to the Department, any changes in the information furnished by him in the "Certificate - In Vitro Testing with Radioactive Material Under General License", Department Form KLM.006. The report shall be furnished within 30 days after the effective date of such change.

- 6) Any person using radioactive material pursuant to the general license of subsection (f)(1) above is exempt from the requirements of 32 Ill. Adm. Code 340 and 400 with respect to radioactive material covered by that general license, except that such persons using the mock iodine-125 described in subsection (f)(1)(E) above shall comply with the provisions of 32 Ill. Adm. Code 340.1010(a), 340.1210 and 340.1220.

g) Ice Detection Devices

- 1) A general license is hereby issued to own, receive, acquire, possess, use and transfer strontium-90 contained in ice detection devices, provided each device contains not more than 1.85 MBq (50 microCi) of strontium-90 and each device has been manufactured or initially transferred in accordance with a specific license issued by the U.S. Nuclear Regulatory Commission or each device has been manufactured or initially transferred in accordance with the specifications contained in a specific license issued by the Department or an Agreement State to the manufacturer of such device pursuant to licensing requirements equivalent to those in 10 CFR 32.61.

- 2) Persons who own, receive, acquire, possess, use or transfer strontium-90 contained in ice detection devices pursuant to the general license in subsection (g)(1) above:

A) Shall, upon occurrence of visually observable damage, such as a bend or crack or discoloration from overheating to the device, discontinue use of the device until it has been inspected, tested for leakage or contamination and repaired by a person holding a specific license from the U.S. Nuclear Regulatory Commission or an Agreement State to manufacture or service such devices; or shall dispose of the device pursuant to the provisions of 32 Ill. Adm. Code 340.1010(a);

B) Shall assure that all labels affixed to the device at the time of receipt, and which bear a statement which prohibits removal of the labels, are maintained thereon; and

C) Are exempt from the requirements of 32 Ill. Adm. Code 340 and 400 except that such persons shall comply with the provisions of 32 Ill. Adm. Code 340.1010(a), 340.1210, 340.1220 and 340.1260.

- 3) This general license does not authorize the manufacture, assembly, disassembly or repair of strontium-90 in ice detection devices.

- 4) This general license is subject to the provisions of 32 Ill. Adm. Code 310.40 through 310.90, 341 and Sections 330.310, 330.400 and 330.500 of this Part.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

SUBPART C: SPECIFIC LICENSES

Section 330.240 Filing Application for Specific Licenses

- a) Applications for specific licenses shall be filed in duplicate on forms prescribed by the Department.
- b) The Department may at any time after the filing of the original application, and before the expiration or termination of the license, require further statements in

order to enable the Department to determine whether the application should be granted or denied or whether an existing license should be modified or revoked.

- c) Each application shall be signed by the applicant or licensee or a person duly authorized to act for and on his behalf.
- d) An application may include a request for a license authorizing one or more activities. The Department will not grant the request if the proposed activities are not under the control of the same facility, administrator and radiation safety officer. In addition, when evaluating the request, the Department will consider complexity, similarity and proximity of the proposed activities.
- e) In the application, the applicant may incorporate by reference information contained in previous applications, statements or reports filed with the Department provided such references are clear and specific.
- f) Public inspection of applications and other documents submitted to the Department pursuant to this Section shall be in accordance with 2 Ill. Adm. Code 1076 and the requirements of the Freedom of Information Act (Ill. Rev. Stat. 1991, ch. 116, par. 201 et seq.) 5 ILCS 140.
- g) An application for a specific license to authorize receipt, possession or use of radioactive material in the form of a sealed source or in a device that contains a sealed source shall either:
 - 1) Identify the sealed source or device that contains a sealed source by manufacturer and model number as filed in an evaluation sheet in the U.S. Department of Health and Human Services "Radioactive Material Reference Manual" or in the U.S. Nuclear Regulatory Commission "Registry of Radioactive Sealed Sources and Devices"; or
 - 2) Contain the information identified in Section 330.280(m).

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.250 General Requirements for the Issuance of Specific Licenses

- a) A license application will be approved only if the Department determines that:
 - 1) The applicant is qualified by reason of training and experience to use the material in question for the purpose requested in accordance with this Part in such a manner as to minimize danger to public health and safety or property;
 - 2) The applicant's proposed equipment, facilities and procedures are adequate to minimize danger to public health and safety or property;
 - 3) The issuance of the license will not be inimical to the health and safety of the public; and
 - 4) The applicant satisfies any applicable special requirements in 32 Ill. Adm. Code: Chapter II, Subchapters b and d.
- b) Environmental Report, Commencement of Construction
 - 1) In the case of an application for a license to receive and possess radioactive material for commercial waste disposal by land burial, or for the conduct of any other activity which the Department determines will significantly affect the quality of the environment, a license application shall be reviewed and approved by the Department before commencement of construction of the plant or facility in which the activity will be conducted. Issuance of the license shall be based upon a consideration by the Department of the

environmental, economic, technical and other benefits in comparison with the environmental costs and available alternatives and a determination that the action called for is the issuance of the proposed license, with any appropriate conditions to protect environmental values;

- 2) Commencement of construction prior to such conclusion shall be grounds for denial of a license to receive and possess radioactive material in such plant or facility. As used in this subsection the term "commencement of construction" means any clearing of land, excavation or other substantial action that would adversely affect the environment of a site. The term does not mean site exploration, necessary borings to determine foundation conditions, or other preconstruction monitoring or testing to establish background information related to the suitability of the site or the protection of environmental values.
- c) Financial Surety Arrangements for Reclaiming Sites. For purposes of this subsection, "reclaiming" shall mean returning property to a condition or state such that the property no longer presents a public health or safety hazard or threat to the environment.
AGENCY NOTE: For purposes of subsection (c) above, the term "reclaiming" includes but is not limited to those activities necessary to decommission the licensed facility (i.e., to remove (as a facility) safely from service and reduce residual radioactivity to a level that permits release of the property for unrestricted use and termination of license).

- 1) Unless exempted by subsections (c)(4) or (5) below, issuance, renewal or amendment of a license shall be dependent upon satisfactory financial surety arrangements to ensure the protection of the public health and safety in the event of abandonment, default or other inability of the licensee to meet the requirements of the Act, this Part or 32 Ill. Adm. Code: Chapter II, Subchapters b and d. Self insurance, or any arrangement which essentially constitutes self insurance, will not satisfy the surety requirements since such arrangement provides no further assurance than being without insurance. Determination of satisfactory surety arrangements shall be subject to the following conditions:

- A) Financial surety arrangements for site reclamation may consist of surety bonds, certificates of deposit, deposits of government securities, letters of credit, insurance policies or any combination of the above for the categories of licenses listed in subsection (c)(3) below. The amount of funds to be ensured by such surety arrangements shall be based on Department-approved reclaiming cost estimates for disposal of all radioactive material authorized under the license, including removal of all radioactive contamination caused by authorized material to a level in conformance with 32 Ill. Adm. Code 340. Appendix A. The Department shall consider the following in approving the cost estimate of the financial surety requirements for each individual applicant or licensee:

- i) The probable extent of contamination through the use or possession of radioactive material at the facility or site and the probable

- cost of removal of such contamination to a level in conformance with 32 Ill. Adm. Code 340. Appendix A. This consideration shall encompass probable contaminating events associated with the licensee's methods or modes of operation and shall be based on factors such as quantities, half-lives, radiation hazards and toxicities, and chemical and physical forms;
- ii) The extent of possible offsite property damage caused by operation of the facility or site;
 - iii) The cost of removal and disposal of sources of radiation, which are or would be generated, stored, processed or otherwise present at the licensed facility or site; and
 - iv) The costs involved in reclaiming the property on which the facility or site is located, and all other properties contaminated by radioactive material authorized under the license.
- B) The financial surety arrangements shall be filed with and maintained by the Chief, Division of Radioactive Materials of the Department (hereafter referred to as the Division Chief) in a dollar amount greater than or equal to the amount approved by the Department and determined necessary to provide for the protection of public health and safety in accordance with subsection (c)(1)(A) above.
- i) A licensee or applicant shall submit a cost estimate for approval by the Department in accordance with subsection (c)(1)(A) above.
 - ii) The licensee's surety arrangements may be reviewed annually by the Department and be adjusted to recognize any increases or decreases resulting from inflation or deflation, changes in engineering plans, activities performed and any other condition affecting costs for reclaiming to ensure that sufficient surety is retained to cover liability which remains until license termination.
 - iii) When a change in activities not requiring a license amendment would raise the cost estimate for reclaiming to an amount greater than the amount of financial surety currently filed with the Division Chief, the licensee shall, within 60 days after the increase, file additional financial surety at least equal to this increase.
 - iv) When a license amendment would raise the cost estimate for reclaiming to an amount greater than the amount of financial surety currently filed with the Division Chief, the amendment shall not be issued until the required surety arrangements are established.
- v) When the current reclaiming cost estimate decreases, upon the written request of the licensee, and provided that the decrease is verified by the Division Chief, the Division Chief shall reduce the amount of financial surety required for the facility to the amount of the current reclaiming costs estimate. Upon such occurrence, the Division Chief shall, considering the financial surety arrangements on file, either cause to be released to the licensee collateral which has been deposited equal to this reduction or allow the licensee to substitute for the arrangements on file new arrangements in the reduced amount.
 - vi) The term of the surety arrangements shall be for the period from issuance of the license until termination of the license by the Department in accordance with Section 330.320.
 - vii) Upon termination of the license, the Division Chief will release all surety amounts not previously forfeited by the licensee.
- C) The Director:
- i) May order that any financial surety filed by a licensee pursuant to subsection (c) be forfeited to the State if the Director determines that the licensee has failed to perform reclaiming to assure health and safety from radiation hazards and comply with other license requirements or orders pertaining to reclaiming. Such forfeiture action shall follow the procedures provided in 32 Ill. Adm. Code 200.
 - ii) Shall, upon the date of issuance of the final order described in subsection (c)(1)(C)(i) above, notify the Attorney General who shall collect the forfeiture if voluntary payment is not made within 30 days of the date of issuance of the final order.
 - iii) Shall deposit all funds from forfeited financial sureties in a temporary, locally-held trust fund to be administered by the Department for site reclaiming.
- D) The licensee or applicant shall choose from the financial sureties arrangements specified in Section 330. Appendix G.
- E) The wording of the financial surety may be identical to the wording of the corresponding arrangement in Section 330. Appendix H and shall contain provisions described in Section 330. Appendix G.
- F) Use of Multiple Financial Surety Arrangements. The licensee or applicant may utilize more than one financial surety arrangement per facility to satisfy the requirement specified in subsection (c)(1) above. These arrangements are limited to

- bonds supported by letters of credit, insurance and securities. The arrangement shall be as specified in Section 330. Appendix G, except that it is the combination of arrangements, rather than the single arrangement, which shall provide financial surety for the necessary amount.
- G) Use of Financial Surety Arrangement for Multiple Facilities and/or Multiple Licensees at a Facility. The licensee or applicant may use a financial surety arrangement specified in Section 330. Appendix G to meet the requirements of subsection (c)(1) above for more than one license he holds, or more than one facility he owns or operates in Illinois. The arrangement submitted to the Division Chief shall include a list indicating, for each facility, the license number(s), name(s), address(es) and amount(s) of funds for reclaiming assured by the arrangement. The amount of funds available through the arrangement shall not be less than the sum of the sureties that would be available if a separate arrangement had been filed and maintained for each license or facility. If more than one license exists for a facility, the amount of funds for each license shall be specified.
- H) Substitution of Alternate Financial Surety Arrangements. The licensee may substitute alternate financial surety arrangements specified in Section 330. Appendix G meeting the requirements of subsection (c)(1) above for the financial surety already filed with the Department for the facility. However, the existing arrangements shall not be released by the Division Chief until the substitute financial surety arrangements have been received and approved.
- I) Any applicant or licensee who fulfills the requirements of subsection (c)(1) above by obtaining a surety bond, letter of credit or insurance policy, will be deemed to be without the required financial surety in the event of bankruptcy of the issuing institution, or a suspension, or revocation of the authority of the institution issuing the surety bond, letter of credit or insurance policy to issue such instruments. The applicant or licensee shall establish other Department-approved financial surety within 30 days after such an event.
- 2) The arrangements required in subsection (c)(1) above shall be established prior to issuance or amendment of the license to assure that sufficient funds will be available for reclaiming.
- 3) The following specific licensees are required to make financial surety arrangements:
- A) Major processors as defined in 32 Ill. Adm. Code 310.20;
 - B) Waste handling licensees as defined in 32 Ill. Adm. Code 310.20;
 - C) Wet source storage irradiators;
 - D) Ore processors which produce source material tailings or sludge;
 - E) Possessors of source material tailings or sludge;
 - F) Persons who use particle accelerators to manufacture radionuclides for distribution to other licensees or customers;
 - G) Former U.S. Atomic Energy Commission or U.S. Nuclear Regulatory Commission licensed facilities that were licensed pursuant to 10 CFR 50, exclusive of subsequent amendments or additions, unless exempted by subsection (c)(4) below.
- 4) The following persons are exempt from the requirements of subsection (c)(1) above:
- A) All State, local or other government agencies, unless they are subject to subsection (c)(3)(A) or (c)(3)(B) above; Agency Note: For purposes of subsection (c), "government agencies" shall not include federal or state contractors, non-governmental recipients of government grants, or non-governmental medical institutions.
 - B) All educational institutions; and Agency Note: An educational institution is a non-profit organization which has as its primary purpose the advancement of knowledge in one or more specific fields and which is accredited by the North Central Association of Colleges and Schools.
 - C) Persons authorized to possess only those radioactive materials with half-lives of 65 days or less.
- 5) Unless also described in subsection (c)(3) above, the following persons are exempt from the requirements of subsection (c)(1) above:
- A) Persons licensed to manufacture or possess, but not distribute, radioactive material for medical purposes, including veterinary medicine;
 - B) Persons licensed to perform industrial radiography;
 - C) Persons licensed to perform wireline service operations and subsurface tracer studies;
 - D) Persons licensed to distribute radiopharmaceuticals, generators or reagent kits as a nuclear pharmacy;
 - E) Persons licensed to distribute, without processing, radioactive material or products containing radioactive material;
 - F) Persons licensed to possess irradiators, other than wet source storage irradiators;
 - G) Persons licensed to possess source material (depleted uranium) for shielding purposes;
 - H) Persons licensed to possess radioactive material for use in analytical instruments; and
 - I) Persons licensed to possess radioactive material in gauges or other measuring systems.
- d) Long-Term Care Requirements
- 1) A license application will be approved only if the Department determines that a long-term care fund for monitoring and maintenance has been established by the waste handling licensee prior to the issuance of the license; or
 - 2) The waste handling applicants may choose, at the time of the licensure, to provide a financial surety arrangement in lieu of a long-term care fund. AGENCY NOTE: Long-term care funding may also be required for former U.S. Atomic Energy Commission or U.S. Nuclear Regulatory

Commission licensed facilities, or persons whose activities cause situations that significantly affect the public health and safety, or the environment by reason of exposure to radiation or radioactive materials.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.260 Special Requirements for Issuance of Certain Specific Licenses for Radioactive Materials

- a) Specific Licenses to Institutions for Human Use of Radioactive Material. A specific license for human use of radioactive material in institutions shall be issued only if the applicant has met the requirements of 32 Ill. Adm. Code 335 and the requirements set forth in Section 330.250.
- b) Specific Licenses to Individual Physicians for Human Use of Radioactive Material. An application by an individual physician or group of physicians for a specific license for human use of radioactive material shall be approved only if:
 - 1) The applicant satisfies the general requirements specified in Section 330.250;
 - 2) The application is for use in the applicant's practice in an office outside a medical institution; and
 - 3) The applicant has met the requirements of 32 Ill. Adm. Code 335.
- c) Specific Licenses for Pharmacies Using Radioactive Material. In addition to the requirements set forth in Section 330.250, a specific license for a pharmacy shall meet the following additional requirements:
 - 1) Radiopharmaceuticals dispensed and/or distributed for human use shall be either:
 - A) Repackaged from prepared radiopharmaceuticals that have been approved by the U.S. Food and Drug Administration (FDA) for medical use as defined in 32 Ill. Adm. Code 335.20; or
 - B) Prepared from generators and reagent kits that are the subject of an FDA-approved "New Drug Application" (NDA) or for which the FDA has accepted an "Investigational New Drug Application" (IND).
 - 2) Prepared radiopharmaceuticals for which FDA has accepted an IND and radiopharmaceuticals prepared from generators or reagent kits for which the FDA has accepted an IND shall be dispensed and/or distributed:
 - A) In accordance with the directions provided by the sponsor of the IND; and
 - B) Only to physicians who have been accepted by the sponsor of the IND to participate in clinical evaluation of the drug.
 - 3) The licensee shall inform in writing each physician who participates in an IND evaluation that the physician is responsible to the sponsor of the IND for use of the drug in accordance with protocols established by the sponsor and for reporting to the sponsor the clinical information obtained through use of the drug.
 - 4) The licensee shall procure biological products labeled with radionuclides or kits used to prepare such products from a supplier who holds an unsuspended or unrevoked license issued by either the U.S. Department of Health, Education and Welfare or the U.S. Department of Health and

Human Services to propagate, manufacture, prepare, label or distribute the products.

- 5) The licensee shall perform radiometric tests for molybdenum breakthrough upon each elution of a molybdenum-99/technetium-99m generator in accordance with the requirements of 32 Ill. Adm. Code 335.4020.
- 6) The licensee shall procure all radiopharmaceuticals from a supplier who manufactures or repackages the product under appropriate pharmaceutical controls related to assay, identity, quality, purity, sterility and non-pyrogenicity.
- 7) The licensee shall dispense radiopharmaceuticals only under the prescription of a specifically licensed physician who is authorized to possess and use the radiopharmaceuticals or of a physician authorized under the provisions of a broad radioactive material license. The licensee shall maintain a copy of the radioactive material license of each customer physician and shall verify that the physician is authorized to receive the prescribed radiopharmaceutical prior to transferring the radiopharmaceutical.
- 8) The licensee may distribute in vitro test kits to customers but shall neither remove any package insert nor violate the packaging.
- 9) The licensee shall subject each batch of sulfur colloid to microscopic tests for particle size and chromatographic tests for free pertechnetate, and shall maintain records of such tests for inspection by the Department. Preparations which contain particles one micron or larger in diameter, have more than ten percent free pertechnetate, or appear flocculent or aggregated shall not be dispensed to customers.
- 10) The licensee shall report to the Department, within 10 days of occurrence, any irregularities pertaining to identification, labeling, quality or assay of any radiopharmaceutical received under the authority of this license.
- d) Use of Sealed Sources in Industrial Radiography. In addition to the requirements set forth in Section 330.250, a specific license for use of sealed sources in industrial radiography will be issued if:
 - 1) The applicant will have an adequate program for training radiographers and radiographer's assistants and submits to the Department a schedule or description of such program which specifies the:
 - A) Initial training;
 - B) Periodic training;
 - C) On-the-job training;
 - D) Means to be used by the licensee to determine the radiographer's knowledge and understanding of and ability to comply with the conditions of the license, the provisions of this Part and 32 Ill. Adm. Code 310, 320, 340, 341, 350 and 400 and the operating and emergency procedures of the applicant; and
 - E) Means to be used by the licensee to determine the radiographer's assistants' knowledge and understanding of and ability to comply with the operating and emergency procedures of the applicant.
 - 2) The applicant has established and submits to the Department satisfactory written operating and emergency procedures described in 32 Ill. Adm. Code 350.2020.
 - 3) The applicant will have an internal inspection system to assure that the requirements of 32 Ill.

Adm. Code 310, 320, 340, 341, 350, 400 and this Part, license provisions and the applicant's operating and emergency procedures are followed by radiographers and radiographer's assistants; the inspection system shall include the performance of internal inspections at intervals not to exceed 3 months and the retention of records of such inspections for 2 years. The inspection records shall contain the date, name of the person performing the inspection, inspection findings and a description of any corrective action taken.

- 4) The applicant submits to the Department a description of the overall organizational structure pertaining to the industrial radiography program, including specified delegations of authority and responsibility for operation of the program.
- 5) The applicant who desires to conduct his own leak tests has established adequate procedures to be followed in testing sealed sources for possible leakage and contamination and submits to the Department a description of such procedures, including:
 - A) Instrumentation to be used;
 - B) Method of performing tests; and
 - C) Pertinent experience of the individual who will perform the test.
- 6) The licensee shall conduct a program for inspection and maintenance of radiographic exposure devices and storage containers to assure proper functioning of components important to safety.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.270 Special Requirements for Specific Licenses of Broad Scope

This Section prescribes requirements for the issuance of specific licenses of broad scope for radioactive material and certain regulations governing holders of such licenses.

AGENCY NOTE: Authority to transfer possession or control by the manufacturer, processor or producer of any equipment, device, commodity or other product containing byproduct material whose subsequent possession, use, transfer and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

- a) The different types of broad scope licenses are set forth below:
 - 1) A "Type A specific license of broad scope" is a specific license authorizing receipt, acquisition, ownership, possession, use and transfer of any chemical or physical form of the radioactive material specified in the license, but not exceeding quantities specified in the license, for any authorized purpose. The quantities specified are usually in multiples of gigabecquerels or curies.
 - 2) A "Type B specific license of broad scope" is a specific license authorizing receipt, acquisition, ownership, possession, use and transfer of any chemical or physical form of radioactive material specified in Section 330. Appendix D, for any authorized purpose. The possession limit for a Type B license of broad scope, if only one radionuclide is possessed thereunder, is the quantity specified for that radionuclide in Column I of Section 330. Appendix D. If two or more radionuclides are possessed thereunder, the possession limit for each is determined as follows: For each radionuclide, determine the ratio

of the quantity possessed to the applicable quantity specified in Column I of Section 330. Appendix D for that radionuclide. The sum of the ratios for all radionuclides possessed under the license shall not exceed unity.

- 3) A "Type C specific license of broad scope" is a specific license authorizing receipt, acquisition, ownership, possession, use and transfer of any chemical or physical form of radioactive material specified in Section 330. Appendix D, for any authorized purpose. The possession limit for a Type C license of broad scope, if only one radionuclide is possessed thereunder, is the quantity specified for that radionuclide in Column II of Section 330. Appendix D. If two or more radionuclides are possessed thereunder, the possession limit is determined for each as follows: For each radionuclide, determine the ratio of the quantity possessed to the applicable quantity specified in Column II of Section 330. Appendix D for that radionuclide. The sum of the ratios for all radionuclides possessed under the license shall not exceed unity.
- b) An application for a Type A specific license of broad scope will be approved if:
 - 1) The applicant satisfies the general requirements specified in Section 330.250;
 - 2) The applicant has engaged in a reasonable number of activities involving the use of radioactive material; and
 - 3) The applicant has established administrative controls and provisions relating to organization and management, procedures, recordkeeping, material control and accounting and management review that are necessary to assure safe operations, including:
 - A) The establishment of a Radiation Safety Committee composed of such persons as a Radiation Safety Officer, a representative of management and persons trained and experienced in the safe use of radioactive material;
 - B) The appointment of a Radiation Safety Officer who is qualified by training and experience in radiation protection, and who is available for advice and assistance on radiation safety matters; and
 - C) The establishment of appropriate administrative procedures to assure:
 - i) Control of procurement and use of radioactive material;
 - ii) Completion of safety evaluations of proposed uses of radioactive material that take into consideration such matters as the adequacy of facilities and equipment, training and experience of the user and the operating or handling procedures; and
 - iii) Review, approval and recording by the Radiation Safety Committee of safety evaluations of proposed uses prepared in accordance with subsection (b)(3)(C)(ii) above prior to use of the radioactive material.
- c) An application for a Type B specific license of broad scope will be approved if:
 - 1) The applicant satisfies the general requirements specified in Section 330.250; and

- 2) The applicant has established administrative controls and provisions relating to organization and management, procedures, recordkeeping, material control and accounting and management review that are necessary to assure safe operations, including:
 - A) The appointment of a Radiation Safety Officer who is qualified by training and experience in radiation protection, and who is available for advice and assistance on radiation safety matters; and
 - B) The establishment of appropriate administrative procedures to assure:
 - i) Control of procurement and use of radioactive material;
 - ii) Completion of safety evaluations of proposed uses of radioactive material that take into consideration such matters as the adequacy of facilities and equipment, training and experience of the user and the operating or handling procedures; and
 - iii) Review, approval and recording by the Radiation Safety Officer of safety evaluations of proposed uses prepared in accordance with subsection (c)(2)(B)(ii) above prior to use of the radioactive material.
- d) An application for a Type C specific license of broad scope will be approved if:
 - 1) The applicant satisfies the general requirements specified in Section 330.250;
 - 2) The applicant submits a statement that radioactive material will be used only by, or under the direct supervision of, individuals who have received:
 - A) A college degree at the bachelor level, or equivalent training and experience, in the physical, or biological sciences or in engineering; and
 - B) At least 40 hours of training and experience in the safe handling of radioactive material, and in the characteristics of ionizing radiation, units of radiation dose and quantities, radiation detection instrumentation and biological hazards of exposure to radiation pertinent to the type and forms of radioactive material to be used; and
 - 3) The applicant has established administrative controls and provisions relating to procurement of radioactive material, procedures, recordkeeping, material control and accounting and management review necessary to assure safe operations.
- e) Specific licenses of broad scope are subject to the following conditions:
 - 1) Unless specifically authorized, persons licensed pursuant to this Section shall not:
 - A) Conduct tracer studies in the environment involving direct release of radioactive material;
 - B) Receive, acquire, own, possess, use or transfer devices containing 3.7 PBq (100 kCi) or more of radioactive material in sealed sources used for irradiation of materials;
 - C) Conduct activities for which a specific license issued by the Department under Sections 330.260 or 330.280 is required; or

- D) Add or cause the addition of radioactive material to any food, beverage, cosmetic, drug or other product designed for ingestion or inhalation by, or application to, a human being.

- 2) Each Type A specific license of broad scope issued under this Part shall be subject to the condition that radioactive material possessed under the license may only be used by, or under the direct supervision of, individuals approved by the licensee's Radiation Safety Committee.
- 3) Each Type B specific license of broad scope issued under this Part shall be subject to the condition that radioactive material possessed under the license may only be used by, or under the direct supervision of, individuals approved by the licensee's Radiation Safety Officer.
- 4) Each Type C specific license of broad scope issued under this Part shall be subject to the condition that radioactive material possessed under the license may only be used by, or under the direct supervision of, individuals who satisfy the requirements of subsection (d) above.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.280 Special Requirements for a Specific License to Manufacture, Assemble, Repair, or Distribute Commodities, Products, or Devices that Contain Radioactive Material

- a) Licensing the Introduction of Radioactive Material into Products in Exempt Concentrations
 - 1) In addition to the requirements set forth in Section 330.250, a specific license authorizing the introduction of radioactive material into a product or material owned by or in the possession of the licensee or another and the transfer of ownership or possession of the product or material containing the radioactive material to persons exempted from this Part pursuant to Sections 330.30 or 330.40(a) will be issued if:
 - A) The applicant submits a description of the product or material into which the radioactive material will be introduced, intended use of the radioactive material and the product or material into which it is introduced, method of introduction, initial concentration of the radioactive material in the product or material, control methods to assure that no more than the specified concentration is introduced into the product or material, estimated time interval between introduction and transfer of the product or material and estimated concentration of the radioactive material in the product or material at the time of transfer; and
 - B) The applicant provides reasonable assurance that the concentrations of radioactive material at the time of transfer will not exceed the concentrations in Section 330. Appendix A, that reconcentration of the radioactive material in concentrations exceeding those in Section 330. Appendix A is not likely, that use of lower concentrations is not feasible and that the product or material is not likely to be incorporated in any food, beverage, cosmetic, drug or other commodity or product designed for

- ingestion or inhalation by, or application to, a human being.
- 2) Each person licensed under subsection (a) is required to maintain records of transfer of material and shall file a report with the Department which shall identify the following:
 - A) Type and quantity of each product or material into which radioactive material has been introduced during the reporting period;
 - B) Name and address of the person who owned or possessed the product or material, into which radioactive material has been introduced, at the time of introduction;
 - C) The radionuclide, activity and activity assay date of radioactive material introduced into each product or material; and
 - D) The initial concentrations of the radionuclide in the product or material at time of transfer of the radioactive material by the licensee.
 - 3) The licensee shall file the report within 30 days following:
 - A) 5 years after filing the preceding report; or
 - B) Filing an application for renewal of the license under Section 330.330; or
 - C) Notifying the Department under Section 330.320(b) of the licensee's decision to permanently discontinue activities authorized under the license issued under this subsection (a).
 - 4) The report shall cover the period between the filing of the preceding report and an occurrence specified in subsection (a)(3) above. If no transfers of radioactive material have been made under subsection (a) during the reporting period, the report shall so indicate.
 - 5) The licensee shall maintain the record of a transfer for a period of 1 year after the event has been included in a report to the Department.
- b) Licensing the Distribution of Radioactive Material in Exempt Quantities
- AGENCY NOTE: Authority to transfer possession or control by the manufacturer, processor or producer of any equipment, device, commodity or other product containing byproduct material whose subsequent possession, use, transfer and disposal by all other persons are exempted from regulatory requirements may be obtained only from the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.
- 1) An application for a specific license to distribute NARM to persons exempted from this Part pursuant to Section 330.40(b) will be approved if:
 - A) The radioactive material is not contained in any food, beverage, cosmetic, drug or other commodity designed for ingestion or inhalation by, or application to, a human being;
 - B) The radioactive material is in the form of processed chemical elements, compounds, or mixtures, tissue samples, bioassay samples, counting standards, plated or encapsulated sources or similar substances, identified as radioactive and to be used for its radioactive properties, but is not incorporated into any manufactured or assembled commodity, product or device intended for commercial distribution; and
 - C) The applicant submits copies of prototype labels and brochures and the Department approves such labels and brochures.
 - 2) The license issued under subsection (b)(1) above is subject to the following conditions:
 - A) No more than ten exempt quantities shall be sold or transferred in any single transaction. However, an exempt quantity may be composed of fractional parts of one or more of the exempt quantities provided the sum of the fractions shall not exceed unity.
 - B) Each exempt quantity shall be separately and individually packaged. No more than ten such packaged exempt quantities shall be contained in any outer package for transfer to persons exempt pursuant to Section 330.40(b). The outer package shall be such that the dose rate at the external surface of the package does not exceed 5 microSv (500 microrem) per hour.
 - C) The immediate container of each quantity or separately packaged fractional quantity of radioactive material shall bear a durable, legible label which:
 - i) Identifies the radionuclide and activity; and
 - ii) Bears the words "Radioactive Material".
 - D) In addition to the labeling information required by subsection (b)(2)(C) above, the label affixed to the immediate container, or an accompanying brochure, shall:
 - i) State that the contents are exempt from Licensing State requirements;
 - ii) Bear the words "Radioactive Material - Not for Human Use - Introduction into Foods, Beverages, Cosmetics, Drugs, or Medicinals or into Products Manufactured for Commercial Distribution is Prohibited - Exempt Quantities Should Not Be Combined"; and
 - iii) Set forth appropriate additional radiation safety precautions and instructions relating to the handling, use, storage and disposal of the radioactive material.
 - 3) Each person licensed under this subsection (b) is required to maintain records and file reports as follows:
 - A) Records of transfer of material identifying, by name and address, each person to whom radioactive material is transferred for use under Section 330.40(b) or the equivalent regulations of an Agreement State, or a Licensing State and stating the kinds and quantities of radioactive material transferred. The licensee shall maintain the record of a transfer for a period of 1 year after the event is included in a summary report to the Department.
 - B) The licensee shall file a summary report stating the total activity of each radioisotope transferred under the specific license with the Department.
 - C) The licensee shall file the summary report within 30 days following:
 - i) 5 years after filing the preceding report; or
 - ii) Filing an application for renewal of the license under Section 330.330; or

- iii) Notifying the Department under Section 330.320(b) of the licensee's decision to permanently discontinue activities authorized under the license issued under subsection (b).
 - D) The report shall cover the period between the filing of the preceding report and an occurrence specified in subsection (b)(3)(C) above. If no transfers of radioactive material have been made under subsection (b) during the reporting period, the report shall so indicate.
- c) Licensing the Incorporation of Naturally Occurring and Accelerator-Produced Radioactive Material into Gas and Aerosol Detectors. An application for a specific license authorizing the incorporation of NARM into gas and aerosol detectors to be distributed to persons exempt under Section 330.40(c)(3) will be approved if the application satisfies requirements equivalent to those contained in 10 CFR 32.26, published January 1, 1993, exclusive of subsequent amendments or editions. The maximum activity of radium-226 in each device shall not exceed 3.7 kBq (100 nCi).
- d) Licensing the Manufacture and Distribution of Devices to Persons Generally Licensed Under Section 330.220(b)
 - 1) An application for a specific license to manufacture or distribute devices containing radioactive material, excluding special nuclear material, to persons generally licensed under Section 330.220(b) or equivalent regulations of the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State will be approved if:
 - A) The applicant satisfies the general requirements of Section 330.250;
 - B) The applicant submits sufficient information relating to the design, manufacture, prototype testing, quality control, labels, proposed uses, installation, servicing, leak testing, operating and safety instructions and potential hazards of the device to provide reasonable assurance that:
 - i) The device can be safely operated by persons not having training in radiological protection;
 - ii) Under ordinary conditions of handling, storage and use of the device, the radioactive material contained in the device will not be released or inadvertently removed from the device and it is unlikely that any person will receive in 1 year a dose in excess of ten percent of the annual limits specified in 32 Ill. Adm. Code 340.210(a); and
 - iii) Under accident conditions such as fire and explosion associated with handling, storage and use of the device, it is unlikely that any person would receive an external radiation dose or dose commitment in excess of the following organ doses:
 - Whole body; head and trunk; active blood-forming organs; gonads; or lens of eye 150 mSv (15 rem)
 - Hands and forearms; feet and ankles; localized areas of skin averaged over areas no larger than 1

square centimeter 2 Sv (200 rem)
 Other organs 500 mSv (50 rem); and

- C) Each device bears a durable, legible, clearly visible label or labels approved by the Department, which contain in a clearly identified and separate statement:

- i) Instructions and precautions necessary to assure safe installation, operation and servicing of the device; documents such as operating and service manuals may be identified in the label and used to provide this information;

- ii) The requirement, or lack of requirement, for testing for leakage or contamination, or for testing any on-off mechanism and indicator, including the maximum time interval for such testing, and the identification of radioactive material by radionuclide, activity and activity assay date; and

- iii) The information called for in one of the following statements, as appropriate, in the same or substantially similar form:

Devices Containing Radioactive Material Other Than Naturally Occurring Radioactive Material

The receipt, possession, use and transfer of this device, Model _____, Serial

No. _____, are subject to a general license or the equivalent and the regulations of the U.S. Nuclear Regulatory Commission or a State with which the U.S. Nuclear Regulatory Commission has entered into an agreement for the exercise of regulatory authority. This label shall be maintained on the device in a legible condition. Removal of this label is prohibited.

CAUTION-RADIOACTIVE MATERIAL

Name of Manufacturer or Distributor

AGENCY NOTE: The model, serial number and name of the manufacturer or distributor may be omitted from this label provided the information is elsewhere specified in labeling affixed to the device.

Devices Containing Naturally-Occurring Radioactive Material

The receipt, possession, use and transfer of this device, Model _____, Serial No.

_____ are subject to a general license or the equivalent and the regulations of a Licensing State. This label shall be maintained on the device in a legible condition. Removal of this label is prohibited.

CAUTION - RADIOACTIVE MATERIAL

Name of Manufacturer or Distributor

AGENCY NOTE: The model, serial number and name of the manufacturer or distributor may be omitted from this label provided the information is elsewhere specified in labeling affixed to the device.

- 2) Except as provided in this subsection, the interval between tests for proper operation of the on-off mechanism and indicator, if any, shall not exceed 6 months. The interval between tests for contamination of the device or for leakage of radioactive material from the device or for both shall not exceed 3 months for devices containing sources designed to emit alpha particles and 6 months for all other devices. In the event the applicant desires that the device be required to be tested at intervals longer than the above, the applicant shall include in the application sufficient information to demonstrate that such longer intervals are justified. The information shall include a description of the performance characteristics of the device or similar devices and of design features that have a significant bearing on the probability or consequences of contamination of the device or leakage of radioactive material from the device or failure of the on-off mechanism and indicator. In determining the acceptable interval for the test for leakage of radioactive material or contamination of the device, the Department will consider information which includes, but is not limited to:
 - A) Primary containment or source capsule;
 - B) Protection of primary containment;
 - C) Method of sealing containment;
 - D) Containment construction materials;
 - E) Form of contained radioactive material;
 - F) Maximum temperature withstood during prototype tests;
 - G) Maximum pressure withstood during prototype tests;
 - H) Maximum activity of contained radioactive material;
 - I) Radiotoxicity of contained radioactive material; and
 - J) Operating experience with identical devices or similarly designed and constructed devices.
- 3) In the event the applicant desires that the general licensee under Section 330.220(b), or under equivalent regulations of the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State, be authorized to install the device, collect the sample to be analyzed by a specific licensee for leakage of, or contamination by, radioactive material, service the device, test the on-off mechanism and indicator or remove the device from installation, the applicant shall include in the application written instructions to be followed by the general licensee, estimated annual doses associated with such activity or activities and bases for such estimates. The submitted information shall demonstrate that performance of such activity or activities by an individual untrained in radiological protection, in addition to other handling, storage and use of devices under the general license, is unlikely to cause that individual to receive an

annual dose in excess of ten percent of the limits specified in 32 Ill. Adm. Code 340.210(a).

- 4) Each person licensed under subsection (d) to distribute devices to generally licensed persons shall:
 - A) Furnish a copy of the general license contained in Section 330.220(b) to each person to whom radioactive material in a device is either transferred directly or through an intermediate person for use pursuant to the general license contained in Section 330.220(b);
 - B) Furnish a copy of the general license contained in the U.S. Nuclear Regulatory Commission's, Agreement State's or Licensing State's regulation equivalent to Section 330.220(b), or alternatively, furnish a copy of the general license contained in Section 330.220(b) to each person to whom he directly or through an intermediate person transfers radioactive material in a device for use pursuant to the general license of the U.S. Nuclear Regulatory Commission, the Agreement State or the Licensing State. If a copy of the general license in Section 330.220(b) is furnished to such a person, it shall be accompanied by a note explaining that the use of the device is regulated by the U.S. Nuclear Regulatory Commission, an Agreement State or Licensing State under requirements substantially the same as those in Section 330.220(b);
 - C) Report to the Department all transfers of such devices to persons for use under the general license in Section 330.220 (b). Such report shall identify each general licensee by name and address, an individual by name and/or position who may constitute a point of contact between the Department and the general licensee, the type and model number of device transferred and the radionuclide and activity contained in the device. If one or more intermediate persons will temporarily possess the device at the intended place of use prior to its possession by the user, the report shall include identification of each intermediate person by name, address, contact and relationship to the intended user. If no transfers have been made to persons generally licensed under Section 330.220(b) during the reporting period, the report shall so indicate. The report shall cover each calendar quarter and shall be filed within 30 days thereafter;
 - D) Furnish reports to other agencies as follows:
 - i) Report to the U.S. Nuclear Regulatory Commission all transfers of such devices to persons for use under the U.S. Nuclear Regulatory Commission general license in 10 CFR 31.5.
 - ii) Report to the responsible state agency all transfers of devices manufactured and distributed pursuant to subsection (d) for use under a general license in that state's regulations equivalent to Section 330.220(b).

- iii) Such reports shall identify each general licensee by name and address, an individual by name and/or position who may constitute a point of contact between the agency and the general licensee, the type and model of the device transferred and the radionuclide and activity contained in the device. If one or more intermediate persons will temporarily possess the device at the intended place of use prior to its possession by the user, the report shall include identification of each intermediate person by name, address, contact and relationship to the intended user. The report shall be submitted within 30 days after the end of each calendar quarter in which such a device is transferred to the generally licensed person.
 - iv) If no transfers have been made to U.S. Nuclear Regulatory Commission licensees during the reporting period, this information shall be reported to the U.S. Nuclear Regulatory Commission.
 - v) If no transfers have been made to general licensees within a particular state during the reporting period, this information shall be reported to the responsible state agency upon request of that agency; and
- E) Keep records showing the name, address and the point of contact for each general licensee to whom he directly or through an intermediate person transfers radioactive material in devices for use pursuant to the general license provided in Section 330.220(b), or equivalent regulations of the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State. The records shall show the date of each transfer, the radionuclide and activity in each device transferred, the identity of any intermediate person and compliance with the report requirements of subsection (d)(4) above. The records required by this subsection shall be maintained for a period of 5 years from the date of the recorded event.
- e) Special Requirements for the Manufacture, Assembly or Repair of Luminous Safety Devices for Use in Aircraft
 - 1) An application for a specific license to manufacture, assemble or repair luminous safety devices containing tritium or promethium-147 for use in aircraft, for distribution to persons generally licensed under Section 330.220(c) will be approved if:
 - A) The applicant satisfies the general requirements specified in Section 330.250; and
 - B) The applicant satisfies the requirements of 10 CFR 32.53 - 32.55 and 32.101, published January 1, 1993, exclusive of subsequent amendments or editions, or their equivalent.
 - 2) Each person licensed under this subsection shall file an annual report with the Department which shall state the total activity of tritium or promethium-147 transferred to persons generally licensed under Section 330.220(c) or equivalent regulations of the U.S. Nuclear Regulatory Commission or an Agreement State. The report shall identify each general licensee by name and address, state the kinds and numbers of luminous devices transferred and specify the activity of tritium or promethium-147 in each kind of device. Each report shall cover the year ending June 30 and shall be filed within 30 days thereafter.
 - f) Special Requirements for License to Manufacture Calibration Sources Containing Americium-241, Plutonium or Radium-226 for Distribution to Persons Generally Licensed Under Section 330.220(e). An application for a specific license to manufacture calibration and reference sources containing americium-241, plutonium or radium-226 for distribution to persons generally licensed under Section 330.220(e) will be approved if:
 - 1) The applicant satisfies the general requirements of Section 330.250; and
 - 2) The applicant satisfies the requirements of 10 CFR 32.57 and 70.39 published January 1, 1993, and certifies that he will satisfy, and subsequently satisfies, the requirements of 10 CFR 32.58, 32.59 and 32.102, published January 1, 1993, exclusive of subsequent amendments or editions.
 - g) Manufacture and Distribution of Radioactive Material for Certain In Vitro Clinical or Laboratory Testing Under General License. An application for a specific license to manufacture or distribute radioactive material for use under the general license of Section 330.220(f), or equivalent regulations of the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State, will be approved if:
 - 1) The applicant satisfies the general requirements specified in Section 330.250.
 - 2) The radioactive material is to be prepared for distribution in prepackaged units of:
 - A) Carbon-14 in units not exceeding 370 kBq (10 microCi) each.
 - B) Cobalt-57 in units not exceeding 370 kBq (10 microCi) each.
 - C) Hydrogen-3 (tritium) in units not exceeding 1.85 MBq (50 microCi) each.
 - D) Iodine-125 in units not exceeding 370 kBq (10 microCi) each.
 - E) Mock iodine-125 in units not exceeding 1.85 kBq (50 nCi) of iodine-129 and 185 Bq (5 nCi) of americium-241 each.
 - F) Iodine-131 in units not exceeding 370 kBq (10 microCi) each.
 - G) Iron-59 in units not exceeding 740 kBq (20 microCi) each.
 - H) Selenium-75 in units not exceeding 370 kBq (10 microCi) each.
 - 3) Each prepackaged unit bears a durable, clearly visible label:
 - A) Identifying the radioactive contents as to chemical form and radionuclide, and indicating that the amount of radioactivity does not exceed 370 kBq (10 microCi) of iodine-125, iodine-131, carbon-14, cobalt-57 or selenium-75; 1.85 MBq (50 microCi) of hydrogen-3 (tritium); 740 kBq (20 microCi) of iron-59; or mock iodine-125 in units not exceeding 1.85 kBq (50 nCi) of iodine-129 and 185 Bq (5 nCi) of americium-241 each; and

- B) Displaying the radiation caution symbol described in 32 Ill. Adm. Code 340.910(a) and the words, "CAUTION - RADIOACTIVE MATERIAL", and "Not for Internal or External Use in Humans or Animals".
- 4) One of the following statements, as appropriate, or a statement which contains the information called for in one of the following statements, appears on a label affixed to each prepackaged unit or appears in a leaflet or brochure which accompanies the package:
- A) This radioactive material may be received, acquired, possessed and used only by physicians, veterinarians, clinical laboratories or hospitals and only for in vitro clinical or laboratory tests not involving internal or external administration of the material, or the radiation therefrom, to human beings or animals. Its receipt, acquisition, possession, use and transfer are subject to the regulations and a general license of the U.S. Nuclear Regulatory Commission or of a state with which the Commission has entered into an agreement for the exercise of regulatory authority.

Name of Manufacturer

- B) This radioactive material may be received, acquired, possessed and used only by physicians, veterinarians, clinical laboratories or hospitals and only for in vitro clinical or laboratory tests not involving internal or external administration of the material, or the radiation therefrom, to human beings or animals. Its receipt, acquisition, possession, use and transfer are subject to the regulations and a general license of a Licensing State.

Name of Manufacturer

- 5) The label affixed to the unit, or the leaflet or brochure which accompanies the package, contains information about the precautions to be followed in handling and storing such radioactive material. In the case of the mock iodine-125 reference or calibration source, the manufacturer shall state in the directions that this item shall be disposed of in compliance with
- h) Licensing the Manufacture and Distribution of Ice Detection Devices. An application for a specific license to manufacture and distribute ice detection devices to persons generally licensed under Section 330.220(g) will be approved if:
- 1) The applicant satisfies the general requirements of Section 330.250; and
 - 2) The criteria of 10 CFR 32.61, 32.62 and 32.103 published January 1, 1993, exclusive of subsequent amendments or editions, are met.
- i) Manufacture and Distribution of Radiopharmaceuticals Containing Radioactive Material for Medical Use Under Specific Licenses. An application for a specific license to manufacture and distribute radiopharmaceuticals containing radioactive material for use by persons licensed pursuant to Section 330.260(a) for the uses described in 32 Ill. Adm. Code 335.3010, 335.4010 or 335.5010 will be approved if:
- 1) The applicant satisfies the general requirements specified in Section 330.250;

- 2) The applicant submits information showing that:
 - A) The radiopharmaceutical containing radioactive material will be manufactured, labeled and packaged in accordance with the Federal Food, Drug, and Cosmetic Act or the Public Health Service Act; or
 - B) The manufacture and distribution of the radiopharmaceutical containing radioactive material is not subject to the Federal Food, Drug, and Cosmetic Act and the Public Health Service Act;
 - 3) The applicant submits information on the radionuclide, chemical and physical form, packaging including maximum activity per package and shielding provided by the packaging of the radioactive material which is appropriate for safe handling and storage of radiopharmaceuticals by specific licensees; and
 - 4) The label affixed to each package of the radiopharmaceutical contains information on the radionuclide, activity and activity assay date and the label affixed to each package, or the leaflet or brochure which accompanies each package, contains a statement that the radiopharmaceutical is licensed by the Department for distribution to persons licensed pursuant to Section 330.260(a) for radioactive material specified in 32 Ill. Adm. Code 335.3010, 335.4010 or 335.5010, as appropriate, or under equivalent licenses of the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State. The labels, leaflets or brochures required by this subsection are in addition to the labeling required by the U.S. Food and Drug Administration (FDA) and may be separate from or, with the approval of FDA, may be combined with the labeling required by FDA.
- j) Manufacture and Distribution of Generators or Reagent Kits for Preparation of Radiopharmaceuticals Containing Radioactive Material.

AGENCY NOTE: Although the Department does not regulate the manufacture and distribution of reagent kits that do not contain radioactive material, it does regulate the use of such reagent kits for the preparation of radiopharmaceuticals containing radioactive material as part of its licensing and regulation of the users of radioactive material. Any manufacturer of reagent kits that do not contain radioactive material who desires to have such reagent kits approved by the Department for use by persons licensed pursuant to Section 330.260(a) for generators or reagent kits specified in 32 Ill. Adm. Code 335.4010 may submit the pertinent information specified in this subsection.

An application for a specific license to manufacture and distribute generators or reagent kits containing radioactive material for preparation of radiopharmaceuticals by persons licensed pursuant to Section 330.260(a) for the uses specified in 32 Ill. Adm. Code 335.4010 will be approved if:

- 1) The applicant satisfies the general requirements specified in Section 330.250;
- 2) The applicant submits evidence that:
 - A) The generator or reagent kit is to be manufactured, labeled and packaged in accordance with the Federal Food, Drug, and Cosmetic Act or the Public Health Service Act; or

- B) The manufacture and distribution of the generator or reagent kit are not subject to the Federal Food, Drug, and Cosmetic Act and the Public Health Service Act;
- 3) The applicant submits information on the radionuclide, chemical and physical form, packaging including maximum activity per package and shielding provided by the packaging of the radioactive material contained in the generator or reagent kit;
- 4) The label affixed to the generator or reagent kit contains information on the radionuclide, activity and activity assay date; and
- 5) The label affixed to the generator or reagent kit, or the leaflet or brochure which accompanies the generator or reagent kit, contains:
 - A) Adequate information, from a radiation safety standpoint, on the procedures to be followed and the equipment and shielding to be used in eluting the generator or processing radioactive material with the reagent kit; and
 - B) A statement that the generator or reagent kit, as appropriate, is approved for use by persons licensed by the Department pursuant to Section 330.260(a) and 32 Ill. Adm. Code 335.4010 or under equivalent licenses of the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State. The labels, leaflets or brochures required by this subsection are in addition to the labeling required by the U.S. Food and Drug Administration (FDA) and they may be separate from or, with the approval of FDA, may be combined with the labeling required by FDA.
- k) Manufacture and Distribution of Sources or Devices Containing Radioactive Material for Medical Use. An application for a specific license to manufacture and distribute sources and devices containing radioactive material to persons licensed pursuant to Section 330.260(a) for use as a calibration or reference source or for the uses listed in 32 Ill. Adm. Code 335.7010 will be approved if:
 - 1) The applicant satisfies the general requirements in Section 330.250;
 - 2) The applicant submits sufficient information regarding each type of source or device pertinent to an evaluation of its radiation safety, including:
 - A) The radioactive material contained, its chemical and physical form and activity;
 - B) Details of design and construction of the source or device;
 - C) Procedures for, and results of, prototype tests to demonstrate that the source or device will maintain its integrity under stresses likely to be encountered in normal use and accidents;
 - D) For devices containing radioactive material, the radiation profile of a prototype device;
 - E) Details of quality control procedures to assure that production sources and devices meet the standards of the design and prototype tests;
 - F) Procedures and standards for calibrating sources and devices;
 - G) Legend and methods for labeling sources and devices as to their radioactive content; and
 - H) Instructions for handling and storing sources or devices from the radiation safety standpoint. These instructions shall be included on a durable label attached to each source or device or attached to a permanent storage container for the source or device; provided, that instructions which are too lengthy for such label may be summarized on the label and printed in detail on a brochure which is referenced on the label;
- 3) The label affixed to the source or device, or to the permanent storage container for the source or device, contains information on the radionuclide, activity and activity assay date and a statement that the source or device is licensed by the Department for distribution to persons licensed pursuant to Section 330.260(a) and 32 Ill. Adm. Code 335.7010 or under equivalent licenses of the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State, provided, that such labeling for sources which do not require long-term storage may be on a leaflet or brochure which accompanies the source;
- 4) In the event the applicant desires that the source or device be required to be tested for leakage of, or contamination by, radioactive material at intervals longer than 6 months, he shall include in his application sufficient information to demonstrate that such longer interval is justified by performance characteristics of the source or device or similar sources or devices and by design features that have a significant bearing on the probability or consequences of radioactive contamination or leakage of radioactive material from the source; and
- 5) In determining the acceptable interval for tests of leakage of, or contamination by, radioactive material, the Department will consider information that includes, but is not limited to:
 - A) Primary containment or source capsule;
 - B) Protection of primary containment;
 - C) Method of sealing containment;
 - D) Containment construction materials;
 - E) Form of contained radioactive material;
 - F) Maximum temperature withstood during prototype tests;
 - G) Maximum pressure withstood during prototype tests;
 - H) Maximum activity of contained radioactive material;
 - I) Radiotoxicity of contained radioactive material; and
 - J) Operating experience with identical sources or devices or similarly designed and constructed sources or devices.
- l) Requirements for License to Manufacture and Distribute Industrial Products Containing Depleted Uranium for Mass-Volume Applications.

An application for a specific license to manufacture industrial products and devices containing depleted uranium for use pursuant to Section 330.210(d) or equivalent regulations of the U.S. Nuclear Regulatory Commission or an Agreement State will be approved if:

 - 1) The applicant satisfies the general requirements specified in Section 330.250.
 - 2) The applicant submits sufficient information relating to the design (including blueprints), manufacture (construction materials and methods), prototype testing (description of testing that will be done and the acceptance criteria), quality control

- procedures, labeling or marking, proposed uses and potential hazards of the industrial product or device to assure that possession, use or transfer of the depleted uranium in the product or device will not cause any individual to receive in any period of 1 year a radiation dose in excess of ten percent of the limits specified in 32 Ill. Adm. Code 340.210(a).
- 3) The applicant submits information assuring that the presence of depleted uranium for a mass-volume application in the product or device will provide a unique benefits to the public, i.e., a benefit which could not be achieved but for the use of depleted uranium. The applicant's methods for use and handling of the product or device will not result in uncontrolled disposal or dispersal of depleted uranium into the environment.
 - 4) The Department will deny any application for a specific license under this subsection if the end use(s) of the industrial product or device cannot be reasonably foreseen.
 - 5) Each person licensed pursuant to subsection (1) of this subsection shall:
 - A) Maintain the level of quality control required by the license in the manufacture of the industrial product or device, and in the installation of the depleted uranium into the product or device;
 - B) Label or mark each unit to:
 - i) Identify the manufacturer of the product or device and the number of the license under which the product or device was manufactured, the fact that the product or device contains depleted uranium and the activity of depleted uranium in each product or device; and
 - ii) State that the receipt, possession, use and transfer of the product or device are subject to a general license or the equivalent and the regulations of the U.S. Nuclear Regulatory Commission or an Agreement State;
 - C) Assure that the depleted uranium before being installed in each product or device has been impressed with the following legend clearly legible through any plating or other covering: "Depleted Uranium";
 - D) Furnish:
 - i) A copy of the general license contained in Section 330.210(d) and a copy of the form, "Registration Certificate - Use of Depleted Uranium Under General License", to each person to whom he transfers depleted uranium in a product or device for use pursuant to the general license contained in Section 330.210(d); or
 - ii) A copy of the general license contained in the U.S. Nuclear Regulatory Commission's or Agreement State's regulation equivalent to Section 330.210(d) and a copy of the U.S. Nuclear Regulatory Commission's or Agreement State's certificate, or alternatively, furnish a copy of the general license contained in Section 330.210(d) and a copy of the form, "Registration Certificate - Use of Depleted Uranium Under General License", to each person to whom he transfers depleted uranium in a product or device for use pursuant to the general license of the U.S. Nuclear Regulatory Commission or an Agreement State, with a note explaining that use of the product or device is regulated by the U.S. Nuclear Regulatory Commission or an Agreement State under requirements substantially the same as those in Section 330.210(d);
 - E) Report to the Department all transfers of industrial products or devices to persons for use under the general license in Section 330.210(d). Such report shall identify each general licensee by name and address, an individual by name and/or position who may constitute a point of contact between the Department and the general licensee, the type and model number of device transferred and the activity of depleted uranium contained in the product or device. The report shall be submitted within 30 days after the end of each calendar quarter in which such a product or device is transferred to the generally licensed person. If no transfers have been made to persons generally licensed under Section 330.210(d) during the reporting period, the report shall so indicate;
 - F) File a report which identifies each general licensee by name and address, an individual by name and/or position who constitutes a point of contact between the agency and the general licensee, the type and model number of the device transferred and the activity of depleted uranium contained in the product or device. The report shall be submitted within 30 days after the end of each calendar quarter in which such product or device is transferred to the generally licensed person. The licensee shall report:
 - i) To the U.S. Nuclear Regulatory Commission all transfers of industrial products or devices to persons for use under the U.S. Nuclear Regulatory Commission general license in 10 CFR 40.25;
 - ii) To the responsible state agency all transfers of devices manufactured and distributed pursuant to subsection (1) for use under a general license in that state's regulations equivalent to Section 330.210(d);
 - iii) To the U.S. Nuclear Regulatory Commission if no transfers have been made by the licensees during the reporting period;
 - iv) To the responsible Agreement State Agency upon the request of that Agency if no transfers have been made to general licensees within a particular Agreement State during the reporting period; and

- G) Keep records showing the name, address and point of contact for each general licensee to whom he transfers depleted uranium in industrial products or devices for use pursuant to the general license provided in Section 330.210(d) or equivalent regulations of the U.S. Nuclear Regulatory Commission or an Agreement State. The records shall be maintained for a period of 2 years and shall show the date of each transfer, the activity of depleted uranium in each product or device transferred and compliance with the report requirements of this Section.
- m) Special Requirements for License to Manufacture, Import or Initially Distribute Sealed Sources or Devices Containing Sealed Sources to Persons Having a Specific License.
 - 1) An application for license to manufacture, import or initially distribute sealed sources or devices containing sealed sources for initial transfer to persons having a specific license to receive such sealed sources or devices will be approved subject to the following conditions:
 - A) The applicant satisfies the general requirements specified in Section 330.250;
 - B) The licensee subject to this subsection (m) shall not transfer a sealed source or device containing a sealed source to any person except in accordance with the requirements of Section 330.400.
 - 2) Any manufacturer, importer or initial distributor of a sealed source or device containing a sealed source whose product is intended for use under a specific license may submit a request to the Department for evaluation of radiation safety information about its product and for filing an evaluation sheet in the U.S. Department of Health and Human Services "Radioactive Material Reference Manual" or in the U.S. Nuclear Regulatory Commission "Registry of Radioactive Sealed Sources and Devices".
 - A) A request for evaluation of a sealed source or device containing a sealed source shall be submitted in duplicate and shall include information required by subsections (m)(2)(B) or (C) below, as applicable, demonstrating that the radiation safety properties of such source or device will not endanger public health and safety or property.
 - B) A request for evaluation of a sealed source shall include the following radiation safety information:
 - i) Proposed uses for the sealed source;
 - ii) Chemical and physical form and maximum quantity of radioactive material in the sealed source;
 - iii) Details of design of the sealed source, including blueprints, engineering drawings or annotated drawings;
 - iv) Details of construction of the sealed source including a description of materials used in construction;
 - v) Radiation profile of a prototype sealed source;
 - vi) Procedures for and results of prototype testing;
 - vii) Details of quality control procedures to be followed in manufacture;
 - viii) A description or facsimile of labeling to be affixed to the sealed source;
 - ix) Leak testing procedures; and
 - x) Any additional information, including experimental studies and tests, required by the Department to facilitate a determination of the safety of the sealed source, as required by Section 330.250.
- C) A request for evaluation of a device containing a sealed source shall include the following radiation safety information:
 - i) Proposed uses for the device;
 - ii) Manufacturer, model number, chemical and physical form and maximum quantity of radioactivity in the sealed source or sources to be used in the device;
 - iii) Details of design of the sealed source, including blueprints, engineering drawings or annotated drawings;
 - iv) Details of construction of the sealed source including a description of materials used in construction;
 - v) Radiation profile of a prototype device;
 - vi) Procedures for and results of prototype testing;
 - vii) Details of quality control procedures to be followed in manufacture;
 - viii) A description or facsimile of labeling to be affixed to the device;
 - ix) Leak testing procedures;
 - x) A description of potential hazards in installation, service, maintenance, handling, use and operation of the device;
 - xi) Information about installation, service and maintenance procedures;
 - xii) Handling, operating and safety instructions; and
 - xiii) Any additional information, including experimental studies and tests, required by the Department to facilitate a determination of the safety of the device as required by Section 330.250.
- D) When evaluating a sealed source or device, the Department will apply the radiation safety criteria described in 10 CFR 32.210(d), published January 1, 1993, exclusive of subsequent amendments or editions.
- E) The person submitting a request for evaluation of a product shall manufacture and distribute the product in accordance with:
 - i) The statements and representations, including the quality control program, described in the request; and
 - ii) The provisions of the evaluation sheet prepared by the Department and submitted to the U.S. Department of Health and Human Services, for filing in the

"Radioactive Material Reference Manual", or to the U.S. Nuclear Regulatory Commission, for filing in "Registry of Radioactive Sealed Sources and Devices".

- n) Manufacture and Distribution of Radioactive Material for Medical Use Under General License. A specific license authorizing the distribution of radioactive materials for diagnostic medical use by a physician under a general license shall be issued only if the applicant for the specific license satisfies the requirements of Section 330.250 and:

- 1) The applicant submits evidence that the radioactive material is to be manufactured, labeled and packaged in accordance with an approval by the commissioner of Food and Drugs, U.S. Food and Drug Administration, or in accordance with an approval for a biologic product issued by the Secretary, U.S. Department of Health and Human Services; and
- 2) One of the following statements, as appropriate, or a statement which contains the information called for in one of the following statements, appears on the label affixed to the container or appears in the leaflet or brochure which accompanies the package:
 - A) This radiopharmaceutical may be received, possessed and used only by physicians licensed to dispense drugs in the practice of medicine. Its receipt, possession, use and transfer are subject to the regulations and a general license or its equivalent of the U.S. Nuclear Regulatory Commission, or of a state with which the Commission has entered into an agreement for the exercise of regulatory authority.

Name of Manufacturer

- B) This radiopharmaceutical may be received, possessed and used only by physicians licensed to dispense drugs in the practice of medicine. Its receipt, possession, use and transfer are subject to the regulations and a general license or its equivalent of a Licensing State.

Name of Manufacturer

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.300 Issuance of Specific Licenses

- a) Upon a determination that an application meets the requirements of the Act and the regulations of the Department, the Department will issue a specific license authorizing the proposed activity in such form and containing such conditions and limitations as it deems appropriate or necessary.
- b) The Department may incorporate in any license at the time of issuance, or thereafter by appropriate rule, regulation or order, such additional requirements and conditions with respect to the licensee's receipt, possession, use and transfer of radioactive material subject to this Part as it deems appropriate or necessary in order to:
 - 1) Minimize danger to public health and safety or property;
 - 2) Require such reports and the keeping of such records, and to provide for such inspections of

activities under the license as may be appropriate or necessary; and

- 3) Prevent loss or theft of material subject to this Part.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.310 Specific Terms and Conditions of License

- a) Each license issued pursuant to this Part shall be subject to all applicable provisions of the Radiation Protection Act of 1990 (the Act) (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 210-1 et seq.) 420 ILCS 40, now or hereafter in effect, and to all applicable rules, regulations and orders of the Department.
- b) No license issued or granted under this Part and no right to possess or utilize radioactive material granted by any license issued pursuant to this Part shall be transferred, assigned, or in any manner disposed of, either voluntarily or involuntarily, directly or indirectly, through transfer of control of any license to any person unless the Department shall, after securing full information, find that the transfer is in accordance with the provisions of the Act, and shall give its consent in writing.
- c) Each person licensed by the Department pursuant to this Part shall confine use and possession of the material licensed to the locations and purposes authorized in the license.
- d) Each licensee shall notify the Department in writing prior to commencing activities to reclaim the licensed facility.
- e) Notification of Bankruptcy
 - 1) Each licensee shall notify the Department, in writing, immediately following the filing of a voluntary or involuntary petition for bankruptcy under any Chapter of Title II (Bankruptcy) of the United States Code by or against:
 - A) The licensee;
 - B) An entity (as the term is defined in 11 U.S.C. 101(14)) controlling the licensee or listing the license or licensee as property of the estate; or
 - C) An affiliate (as the term is defined in 11 U.S.C. 101(2)) of the licensee.
 - 2) This notification shall indicate:
 - A) The bankruptcy court in which the petition for bankruptcy was filed; and
 - B) The date of the filing of the petition.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.320 Expiration and Termination of Licenses

- a) Except as provided in Section 330.330(b), the authority to engage in licensed activities as specified in the specific license shall expire at the end of the specified day in the month and year stated therein. Any expiration date on a specific license applies only to the authority to engage in licensed activities. Expiration of a specific license shall not relieve the licensee of responsibility for decommissioning its facility and terminating the specific license.
- b) Each licensee shall notify the Department immediately, in writing, and request termination of the license when the licensee decides to terminate all activities involving radioactive materials authorized under the license. This notification and request for termination shall include the documents required by subsection (d) below and shall

otherwise substantiate that the licensee has met all of the requirements in subsection (d) below.

- c) No less than 30 days before the expiration date specified in the license, the licensee shall either:
 - 1) Submit an application for license renewal under Section 330.330; or
 - 2) Notify the Department, in writing, if the licensee decides not to renew the license. The licensee requesting termination of a license shall comply with the requirements of subsection (d) below.
- d) Termination of Licenses
 - 1) If a licensee does not submit an application for license renewal under Section 330.330, the licensee shall, on or before the expiration date specified in the license:
 - A) Terminate use of radioactive material;
 - B) Remove radioactive contamination to the level outlined in
 - C) Properly dispose of radioactive material;
 - D) Submit a completed Department Form KLM.007; and
 - E) Submit a radiation survey report to confirm the absence of radioactive materials or to establish the levels of residual radioactive contamination, unless the licensee demonstrates the absence of residual radioactive contamination in some other manner. The radiation survey report shall specify the instrumentation used and certify that each instrument was properly calibrated and tested. The licensee shall, as applicable, report levels or quantities of:
 - i) Beta and gamma radiation at 1 centimeter from surfaces in units, multiples, or subunits of sieverts or rem per hour;
 - ii) Gamma radiation at 1 meter from surfaces in units, multiples, or subunits of sieverts or rem per hour;
 - iii) Removable radioactivity on surfaces in units, multiples, or subunits of becquerels or curies per 100 square centimeters of surface area, or in disintegrations (transformations) per minute per 100 square centimeters of surface area;
 - iv) Fixed radioactivity on surfaces in units, multiples, or subunits of becquerels or curies per 100 square centimeters of surface areas or in disintegrations (transformations) per minute per 100 square centimeters of surface area;
 - v) Radioactivity in contaminated liquids such as water, oils or solvents in units, multiples, or subunits of becquerels or curies per milliliter of volume; and
 - vi) Radioactivity in contaminated solids such as soils or concrete in units, multiples, or subunits of becquerels or curies per gram of solid.
 - 2) If no residual radioactive contamination attributable to activities conducted under the license is detected, the licensee shall submit a certification that no detectable radioactive contamination was found. The Department will notify the licensee, in writing, of the termination of the license.

- 3) If detectable levels or residual radioactive contamination attributable to activities conducted under the license are found:
 - A) The license continues in effect beyond the expiration date, if necessary, with respect to possession of residual radioactive material present as contamination until the Department notifies the licensee in writing that the license is terminated. During this time the licensee is subject to the provisions of subsection (e) below.
 - B) In addition to the information submitted under subsections (1)(D) and (1)(E) above, the licensee shall submit a plan for decontamination, if required, as regards residual radioactive contamination remaining at the time the license expires.

- e) Each licensee who possesses residual radioactive material under subsection (d)(3) above, following the expiration date specified in the license, shall:
 - 1) Limit actions involving radioactive material to those related to decontamination and other activities related to preparation for release for unrestricted use; and
 - 2) Continue to control entry to restricted areas until they are suitable for release for unrestricted use and the Department notifies the licensee in writing that the license is terminated.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.330 Renewal of Licenses

- a) Applications for renewal of specific licenses shall be filed in accordance with Section 330.240.
- b) In any case in which a licensee, not less than 30 days prior to expiration of his existing license, has filed an application in proper form for renewal or for a new license authorizing the same activities, such existing license shall not expire until final action has been taken by the Department.

(Source: Amended at 10 Ill. Reg. 17315, effective September 26, 1986)

Section 330.340 Amendment of Licenses at Request of Licensee

Applications for amendment of a license shall be filed in accordance with Section 330.240 and shall specify the purpose for which the licensee desires the license to be amended and the grounds for such amendment. The Department shall not issue amendments to licenses that were issued before June 1, 1987, for naturally occurring or accelerator produced radioactive material to authorize use, possession, or receipt of source, byproduct, or special nuclear material.

(Source: Amended at 15 Ill. Reg. 10632, effective July 15, 1991)

Section 330.350 Department Action on Application to Renew and Amend

In considering an application by a licensee to renew or amend the license, the Department will apply the criteria set forth in Sections 330.250, 330.260, 330.270 or 330.280 as applicable.

(Source: Amended at 10 Ill. Reg. 17315, effective September 25, 1986)

Section 330.360 Persons Possessing a License for Source, Byproduct, or Special Nuclear Material in Quantities Not Sufficient to Form a Critical Mass on Effective Date of This Part

Any person who, on the effective date of this Part, possesses a general or specific license for source, byproduct, or special nuclear material in quantities not sufficient to form a critical mass, issued by the U.S. Nuclear Regulatory Commission, shall be deemed to possess a like license issued under this Part and the Act. Such license shall expire on the date of expiration specified in the U.S. Nuclear Regulatory Commission license.

(Source: Amended at 10 Ill. Reg. 17315, effective September 25, 1986)

Section 330.370 Persons Possessing Accelerator-Produced or Naturally-Occurring Radioactive Material on Effective Date of This Part (Repealed)

(Source: Repealed at 10 Ill. Reg. 17315, effective September 25, 1986)

Section 330.400 Transfer of Material

- a) No licensee shall transfer radioactive material except as authorized pursuant to this Section.
- b) Except as otherwise provided in his license and subject to the provisions of subsections (c) and (d) below, any licensee may transfer radioactive material:
 - 1) To the Department if prior approval has been granted by the Department;
 - 2) To the U.S. Department of Energy;
 - 3) To any person exempt from the regulations in this Part to the extent permitted under such exemption;
 - 4) To any person authorized to receive such material under terms of a general license or its equivalent, or a specific license or equivalent licensing document, issued by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State, or a Licensing State or to any person otherwise authorized to receive such material by the Federal Government or any agency thereof, the Department, an Agreement State or a Licensing State; or
 - 5) As otherwise authorized by the Department in writing.
- c) Before transferring radioactive material to a specific licensee of the Department, or to a general licensee who is required to register with the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State prior to receipt of the radioactive material, the licensee transferring the material shall verify that the transferee's license authorizes the receipt of the radionuclide, form and activity of radioactive material to be transferred.
- d) The following methods for the verification required by subsection (c) above are acceptable:
 - 1) The transferor may possess a current copy of the transferee's specific license or registration certificate authorizing the transferee to receive the radionuclide, form and activity of radioactive material to be transferred;
 - 2) The transferor may possess a written certification by the transferee that the transferee is authorized by license or registration certificate to receive the radionuclide, form and activity of radioactive material to be transferred, specifying the license or registration certificate number, issuing agency and expiration date;

- 3) For emergency shipments, the transferor may accept oral certification by the transferee that the transferee is authorized by license or registration certificate to receive the radionuclide, form and activity of radioactive material to be transferred, specifying the license or registration certificate number, issuing agency and expiration date; provided, that the oral certification is confirmed in writing within 10 days;
- 4) The transferor may obtain other information compiled by a reporting service from official records of the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State regarding the identity of licensees and the scope and expiration dates of licenses and registration; or
- 5) When none of the methods of verification described in subsections (d)(1) through (4) above are readily available or when a transferor desires to verify that information received by one of such methods is correct or up-to-date, the transferor may obtain and record confirmation from the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State that the transferee is licensed to receive the radioactive material.
- e) Shipment and transport of radioactive material shall be in accordance with the provisions of 32 Ill. Adm. Code 341.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.500 Modification and Revocation of Licenses

- a) The terms and conditions of all licenses shall be subject to amendment, revision, or modification or the license may be suspended or revoked by reason of amendments to the Act, or by reason of rules, regulations, and orders issued by the Department in accordance with
- b) In accordance with 32 Ill. Adm. Code 200, any license may be revoked, suspended, or modified, in whole or in part, for any material false statement in the application or any statement of fact required under provisions of the Act, or because of conditions revealed by such application or statement of fact or any report, record, or inspection or other means which would warrant the Department to refuse to grant a license on an original application, or for violation of, or failure to observe any of the terms and conditions of the Act, or of the license, or of any rule, regulation, or order of the Department.
- c) Except in cases of willfulness or those in which the public health, interest, or safety requires otherwise, no license shall be modified, suspended, or revoked unless, prior to the institution of proceedings therefor, facts or conduct which may warrant such action shall have been called to the attention of the licensee in writing and the licensee shall have been accorded an opportunity to demonstrate or achieve compliance with all lawful requirements.

(Source: Amended at 10 Ill. Reg. 17315, effective September 25, 1986)

Section 330.900 Reciprocal Recognition of Licenses

- a) Licenses of Byproduct, Source and Special Nuclear Material in Quantities Not Sufficient to Form a Critical Mass
 - 1) Subject to this Part, any person who holds a specific license from the U.S. Nuclear Regulatory Commission or an Agreement State is hereby

granted a general license to conduct the activities authorized in such licensing document within this State for a period not in excess of 180 days in any 12-month period provided that:

- A) A current copy of the licensing document is on file with the Department and activities authorized by such document are not limited to specified installations or locations;
 - B) The out-of-state licensee notifies the Department by telephone, telefacsimile, telegraph or letter prior to engaging in such activities. Such notification shall indicate the location, period and type of proposed possession and use within the State. If initial notification was by telephone, telefacsimile or telegraph, the out-of-state licensee shall submit to the Department within 10 days following such notification a letter which contains the above information. Upon receipt from the out-of-state licensee of a written request which contains a schedule of activities to be conducted within Illinois, the Department will waive the requirement for additional notifications of activities on that schedule during the 12-month period following the receipt of the initial notification from a person engaging in activities under the general license provided in subsection (a)(1);
 - C) The out-of-state licensee complies with 32 Ill. Adm. Code: Chapter II and with all the terms and conditions of the licensing document, except any such terms and conditions which may be inconsistent with 32 Ill. Adm. Code: Chapter II;
 - D) The out-of-state licensee supplies such other information as the Department may request; and
 - E) The out-of-state licensee shall not transfer or dispose of radioactive material possessed or used under the general license provided in subsection (a)(1) above except by transfer to a person:
 - i) Specifically licensed by the Department or by the U.S. Nuclear Regulatory Commission to receive such material; or
 - ii) Exempt from the requirements for a license for such material under Section 330.40 (a).
- 2) Notwithstanding the provisions of subsection (a)(1) above, any person who holds a specific license issued by the U.S. Nuclear Regulatory Commission or an Agreement State authorizing the holder to manufacture, transfer, install or service a device described in Section 330.220 (b)(1) within areas subject to the jurisdiction of the licensing body is hereby granted a general license to install, transfer, demonstrate or service such a device in this State provided that:
- A) Such person shall file a report with the Department within 30 days after the end of each calendar quarter in which any device is transferred to or installed in this State. Each such report shall identify each general licensee to whom such device is transferred by name and address, the type of device transferred and the radionuclide and activity

of radioactive material contained in the device;

- B) The device has been manufactured, labeled, installed and serviced in accordance with applicable provisions of the specific license issued to such person by the U.S. Nuclear Regulatory Commission or an Agreement State;
 - C) Such person shall assure that any labels required to be affixed to the device under regulations of the authority that licensed manufacture of the device bear a statement that "Removal of this label is prohibited"; and
 - D) The holder of the specific license shall furnish to each general licensee to whom he transfers or on whose premises he installs such a device a copy of the general license contained in Section 330.220 (b) or in equivalent regulations of the agency having jurisdiction over the manufacture and distribution of the device.
- 3) The Department may withdraw, limit or qualify its acceptance of any specific license or equivalent licensing document issued by the U.S. Nuclear Regulatory Commission or an Agreement State, or any product distributed pursuant to such licensing document, if the Department determines that had the individual been licensed in Illinois by the Department, the license would have been subject to action under Section 330.500 or 32 Ill. Adm. Code 310.90.
- b) Licenses of Naturally Occurring and Accelerator-Produced Radioactive Material
- 1) Subject to this Part, any person who holds a specific license or equivalent authorization from a Licensing State is hereby granted a general license to conduct the activities authorized in such licensing document or equivalent authorization within this State for a period not in excess of 180 days in any 12-month period, provided that:
 - A) A current copy of the licensing document or equivalent authorization is on file with the Department and the activities authorized by such document are not limited to specified installations or locations;
 - B) The out-of-state licensee notifies the Department by telephone, telefacsimile, telegraph or letter prior to engaging in such activities. Such notification shall indicate the location, period and type of proposed possession and use within the State. If initial notification was by telephone, telefacsimile or telegraph, the out-of-state licensee shall submit to the Department within 10 days following such notification a letter which contains the above information. Upon receipt from the out-of-state licensee of a written request which contains a schedule of activities to be conducted within Illinois, the Department will waive the requirement for additional notifications of activities on that schedule during the 12-month period following the receipt of the initial notification from a person engaging in activities under the general license provided in subsection (a)(1);
 - C) The out-of-state licensee complies with 32 Ill. Adm. Code: Chapter II and with all the

terms and conditions of the licensing document or equivalent authorization, except any such terms and conditions which may be inconsistent with 32 Ill. Adm. Code: Chapter II;

- D) The out-of-state licensee supplies any other information necessary to show compliance with 32 Ill. Adm. Code: Chapter II; and
 - E) The out-of-state licensee shall not transfer or dispose of radioactive material possessed or used under the general license provided in subsection (b)(1) above except by transfer to a person:
 - i) Specifically licensed by the Department or by another Licensing State to receive such material; or
 - ii) Exempt from the requirements for a license for such material under Section 330.40.
- 2) Notwithstanding the provisions of subsection (b)(1) above, any person who holds a specific license or equivalent authorization issued by a Licensing State authorizing the holder to manufacture, transfer, install, or service a device described in Section 330.220(b)(1) within areas subject to the jurisdiction of the licensing body is hereby granted a general license to install, transfer, demonstrate or service such a device in this State provided that:
- A) Such person shall file a report with the Department within 30 days after the end of each calendar quarter in which any device is transferred to or installed in this State. Each such report shall identify each general licensee to whom such device is transferred by name and address, the type of device transferred and the radionuclide and activity of radioactive material contained in the device;
 - B) The device has been manufactured, labeled, installed and serviced in accordance with applicable provisions of the specific license or equivalent authorization issued to such person by a Licensing State;
 - C) Such person shall assure that any labels required to be affixed to the device under regulations of the authority that licensed or otherwise authorized manufacture of the device bear a statement that "Removal of this label is prohibited"; and
 - D) The holder of the specific license or equivalent authorization shall furnish to each general licensee to whom he transfers or on whose premises he installs such a device a copy of the general license contained in Section 330.220(b) or in equivalent regulations of the agency having jurisdiction over the manufacture and distribution of the device.
- 3) The Department may withdraw, limit or qualify its acceptance of any specific license or equivalent authorization issued by a Licensing State, or any product distributed pursuant to such license or equivalent authorization, if the Department determines that had the out-of-state licensee been licensed by Illinois, the licensee's license would have been subject to action under Section 330.500 or 32 Ill. Adm. Code 310.90.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

SUBPART D: TRANSPORTATION (Repealed)

Section 330.1000 Transportation of Radioactive Material (Repealed) Section 330.1000 Transportation of Radioactive Material (Repealed)

(Source: Repealed at 10 Ill. Reg. 17315, effective September 25, 1986)

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Section 330.APPENDIX A Exempt Concentrations

Element (atomic number)	Isotope	Column I Gas Concentration (1)		Column II Liquid and Solid Concentration (2)	
		Bg/ml	microCi/ml	Bg/ml	microCi/m
Antimony (51)	Sb-122			1.11x10(1)	3X10(-4)
	Sb-124			7.40x10(0)	2X10(-4)
	Sb-125			3.70x10(1)	1X10(-3)
Argon (18)	Ar-37	3.70x10(1)	1X10(-3)		
	Ar-41	1.48x10(-2)	4X10(-7)		
Arsenic (33)	As-73			1.85x10(2)	5X10(-3)
	As-74			1.85x10(1)	5X10(-4)
	As-76			7.40x10(0)	2X10(-4)
	As-77			2.96x10(1)	8X10(-4)
Barium (56)	Ba-131			7.40x10(1)	2X10(-3)
	Ba-140			1.11x10(1)	3X10(-4)
Beryllium (4)	Be-7			7.40x10(2)	2X10(-2)
Bismuth (83)	Bi-206			1.48x10(1)	4X10(-4)
Bromine (35)	Br-82	1.48x10(-2)	4X10(-7)	1.11x10(2)	3X10(-3)
Cadmium (48)	Cd-109			7.40x10(1)	2X10(-3)
	Cd-115m			1.11x10(1)	3X10(-4)
	Cd-115			1.11x10(1)	3X10(-4)
Calcium (20)	Ca-45			3.33x10(0)	9X10(-5)
	Ca-47			1.85x10(1)	5x10(-4)
Carbon (6)	C-14	3.70x10(-2)	1X10(-6)	2.96x10(2)	8X10(-3)
Cerium (58)	Ce-141			3.33x10(1)	9X10(-4)
	Ce-143			1.48x10(1)	4X10(-4)
	Ce-144			3.70x10(0)	1X10(-4)
Cesium (55)	Cs-131			7.40x10(2)	2X10(-2)
	Cs-134m			2.22x10(3)	6X10(-2)
	Cs-134			3.33x10(0)	9X10(-5)
Chlorine (17)	Cl-38	3.33x10(-2)	9X10(-7)	1.48x10(2)	4X10(-3)
Chromium (24)	Cr-51			7.40x10(2)	2X10(-2)
Cobalt (27)	Co-57			1.85x10(2)	5X10(-3)
	Co-58			3.70x10(1)	1X10(-3)
	Co-60			1.85x10(1)	5X10(-4)
Copper (29)	Cu-64			1.11x10(2)	3X10(-3)
Dysprosium (66)	Dy-165			1.48x10(2)	4X10(-3)
	Dy-166			1.48x10(1)	4X10(-4)
Erbium (68)	Er-169			3.33x10(1)	9X10(-4)
	Er-171			3.70x10(1)	1X10(-3)
Europium (63)	Eu-152 (9.2 h)			2.22x10(1)	6X10(-4)
	Eu-155			7.40x10(1)	2X10(-3)
Fluorine (9)	F-18	7.40x10(-2)	2X10(-6)	2.96x10(2)	8X10(-3)

Gadolinium (64)	Gd-153			7.40x10(1)	2X10(-3
	Gd-159			2.96x10(1)	8X10(-4
Gallium (31)	Ga-72			1.48x10(1)	4X10(-4
Germanium (32)	Ge-71			7.40x10(2)	2X10(-2
Gold (79)	Au-196			7.40x10(1)	2X10(-3
	Au-198			1.85x10(1)	5X10(-4
	Au-199			7.40x10(1)	2X10(-3
Hafnium (72)	Hf-181			2.59x10(1)	7X10(-4
Hydrogen (1)	H-3	1.85x10(-1)	5X10(-6)	1.11x10(3)	3X10(-2
Indium (49)	In-113m			3.70x10(2)	1X10(-2
	In-114m			7.40x10(0)	2X10(-4
Iodine (53)	I-126	1.11x10(-4)	3X10(-9)	7.40x10(-1)	2X10(-5
	I-131	1.11x10(-4)	3X10(-9)	7.40x10(-1)	2X10(-5
	I-132	2.96x10(-3)	8X10(-8)	2.22x10(1)	6X10(-4
	I-133	3.70x10(-4)	1X10(-8)	2.59x10(0)	7X10(-5
	I-134	7.40x10(-3)	2X10(-7)	3.70x10(1)	1X10(-3
Iridium (77)	Ir-190			7.40x10(1)	2X10(-3
	Ir-192			1.48x10(1)	4X10(-4
	Ir-194			1.11x10(1)	3X10(-4
Iron (26)	Fe-55			2.96x10(2)	8X10(-3
	Fe-59			2.22x10(1)	6X10(-4
Krypton (36)	Kr-85m	3.70x10(-2)	1X10(-6)		
	Kr-85	1.11x10(-1)	3X10(-6)		
Lanthanum (57)	La-140			7.40x10(0)	2X10(-4
Lead (82)	Pb-203			1.48x10(2)	4X10(-3
Lutetium (71)	Lu-177			3.70x10(1)	1X10(-3
Manganese (25)	Mn-52			1.11x10(1)	3X10(-4
	Mn-54			3.70x10(1)	1X10(-3
	Mn-56			3.70x10(1)	1X10(-3
Mercury (80)	Hg-197m			7.40x10(1)	2X10(-3
	Hg-197			1.11x10(2)	3X10(-3
	Hg-203			7.40x10(0)	2X10(-4
Molybdenum (42)	Mo-99			7.40x10(1)	2X10(-3
Neodymium (60)	Nd-147			2.22x10(1)	6X10(-4
	Nd-149			1.11x10(2)	3X10(-3
Nickel (28)	Ni-65			3.70x10(1)	1X10(-3
Niobium (Columbium) (41)	Nb-95			3.70x10(1)	1X10(-3
	Nb-97			3.33x10(2)	9X10(-3
Osmium (76)	Os-185			2.59x10(1)	7X10(-4
	Os-191m			1.11x10(3)	3X10(-2
	Os-191			7.40x10(1)	2X10(-3
	Os-193			2.22x10(1)	6X10(-4
Palladium (46)	Pd-103			1.11x10(2)	3X10(-3
	Pd-109			3.33x10(1)	9X10(-4
Phosphorus (15)	P-32			7.40x10(0)	2X10(-4

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Platinum (78)	Pt-191			3.70x10(1)	1X10(-3)
	Pt-193m			3.70x10(2)	1X10(-2)
	Pt-197m			3.70x10(2)	1X10(-2)
	Pt-197			3.70x10(1)	1X10(-3)
Potassium (19)	K-42			1.11x10(2)	3X10(-3)
Praseodymium (59)	Pr-142			1.11x10(1)	3X10(-4)
	Pr-143			1.85x10(1)	5X10(-4)
Promethium (61)	Pm-147			7.40x10(1)	2X10(-3)
	Pm-149			1.48x10(1)	4X10(-4)
Rhenium (75)	Re-183			2.22x10(2)	6X10(-3)
	Re-186			3.33x10(1)	9X10(-4)
	Re-188			2.22x10(1)	6X10(-4)
Rhodium (45)	Rh-103m			3.70x10(3)	1X10(-1)
	Rh 105			3.70x10(1)	1X10(-3)
Rubidium (37)	Rb-86			2.59x10(1)	7X10(-4)
Ruthenium (44)	Ru-97			1.48x10(2)	4X10(-3)
	Ru-103			2.96x10(1)	8X10(-4)
	Ru-105			3.70x10(1)	1X10(-3)
	Ru-106			3.70x10(0)	1X10(-4)
Samarium (62)	Sm-153			2.96x10(1)	8X10(-4)
Scandium (21)	Sc-46			1.48x10(1)	4X10(-4)
	Sc-47			3.33x10(1)	9X10(-4)
	Sc-48			1.11x10(1)	3X10(-4)
Selenium (34)	Se-75			1.11x10(2)	3X10(-3)
Silicon (14)	Si-31			3.33x10(2)	9X10(-3)
Silver (47)	Ag-105			3.70x10(1)	1X10(-3)
	Ag-110m			1.11x10(1)	3X10(-4)
	Ag-111			1.48x10(1)	4X10(-4)
Sodium (11)	Na-24			7.40x10(1)	2X10(-3)
Strontium (38)	Sr-85			3.70x10(1)	1X10(-3)
	Sr-89			3.70x10(0)	1X10(-4)
	Sr-91			2.59x10(1)	7X10(-4)
	Sr-92			2.59x10(1)	7X10(-4)
Sulfur (16)	S-35	3.33x10(-3)	9X10(-8)	2.22x10(1)	6X10(-4)
Tantalum (73)	Ta-182			1.48x10(1)	4X10(-4)
Technetium (43)	Tc-96m			3.70x10(3)	1X10(-1)
	Tc-96			3.70x10(1)	1X10(-3)
Tellurium (52)	Te-125m			7.40x10(1)	2X10(-3)
	Te-127m			2.22x10(1)	6X10(-4)
	Te-127			1.11x10(2)	3X10(-3)
	Te-129m			1.11x10(1)	3X10(-4)
	Te-131m			2.22x10(1)	6X10(-4)
	Te-132			1.11x10(1)	3X10(-4)
Terbium (65)	Tb-160			1.48x10(1)	4X10(-4)

Thallium (81)	Tl-200			1.48x10(2)	4X10(-3)
	Tl-201			1.11x10(2)	3X10(-3)
	Tl-202			3.70x10(1)	1X10(-3)
	Tl-204			3.70x10(1)	1X10(-3)
Thulium (69)	Tm-170			1.85x10(1)	5X10(-4)
	Tm-171			1.85x10(2)	5X10(-3)
Tin (50)	Sn-113			3.33x10(1)	9X10(-4)
	Sn-125			7.40x10(0)	2X10(-4)
Tungsten (Wolfram) (74)	W-181			1.48x10(2)	4X10(-3)
	W-187			2.59x10(1)	7X10(-4)
Vanadium (23)	V-48			1.11x10(1)	3X10(-4)
Xenon (54)	Xe-131m	1.48x10(-1)	4X10(-6)		
	Xe-133	1.11x10(-1)	3X10(-6)		
	Xe-135	3.70x10(-2)	1X10(-6)		
Ytterbium (70)	Yb-175			3.70x10(1)	1X10(-3)
Yttrium (39)	Y-90			7.40x10(0)	2X10(-4)
	Y-91m			1.11x10(3)	3X10(-2)
	Y-91			1.11x10(1)	3X10(-4)
	Y-92			2.22x10(1)	6X10(-4)
	Y-93			1.11x10(1)	3X10(-4)
Zinc (30)	Zn-65			3.70x10(1)	1X10(-3)
	Zn-69m			2.59x10(1)	7X10(-4)
	Zn-69			7.40x10(2)	2X10(-2)
Zirconium (40)	Zr-95			2.22x10(1)	6X10(-4)
	Zr-97			7.40x10(0)	2X10(-4)
Beta - and/or gamma-emitting radioactive material not listed above with half-life of less than 3 years.		3.70x10(-6)	1X10(-10)	3.70x10(2)	1X10(-6)

(1)Values are given in Column I only for those materials normally used as gases.

(2)Bq or microCi/g for solids.

NOTE 1: Many radioisotopes transform into isotopes which are also radioactive. In expressing the concentrations in this Appendix, the activity stated is that of the parent isotope and takes into account the daughters.

NOTE 2: For purposes of Section 330.40 where there is involved a combination of isotopes, the limit for the combination should be derived as follows: Determine for each isotope in the product the ratio between the radioactivity concentration present in the product and the exempt radioactivity concentration established in this Appendix for the specific isotope when not in combination. The sum of such ratios may not exceed "1".

EXAMPLE:
$$\frac{\text{Concentration of Isotope A in Product}}{\text{Exempt Concentration of Isotope A}} \times 10\%, \text{ if}$$

$$\frac{\text{Concentration of Isotope B in Product}}{\text{Exempt Concentration of Isotope B}}$$
 is less than or equal to 1

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.APPENDIX B Exempt Quantities

Radioactive Material		kBq	microCi
Antimony-122	(Sb-122)	3,700	100
Antimony-124	(Sb-124)	370	10
Antimony-125	(Sb-125)	370	10
Arsenic-73	(As-73)	3,700	100
Arsenic-74	(As-74)	370	10
Arsenic-76	(As-76)	370	10
Arsenic-77	(As-77)	3,700	100
Barium-131	(Ba-131)	370	10
Barium-133	(Ba-133)	370	10
Barium-140	(Ba-140)	370	10
Bismuth-210	(Bi-210)	37	1
Bromine-82	(Br-82)	370	10
Cadmium-109	(Cd-109)	370	10
Cadmium-115m	(Cd-115m)	370	10
Cadmium-115	(Cd-115)	3,700	100
Calcium-45	(Ca-45)	370	10
Calcium-47	(Ca-47)	370	10
Carbon-14	(C-14)	3,700	100
Cerium-141	(Ce-141)	3,700	100
Cerium-143	(Ce-143)	3,700	100
Cerium-144	(Ce-144)	37	1
Cesium-129	(Cs-129)	3,700	100
Cesium-131	(Cs-131)	37,000	1,000
Cesium-134m	(Cs-134m)	3,700	100
Cesium-134	(Cs-134)	37	1
Cesium-135	(Cs-135)	370	10
Cesium-136	(Cs-136)	370	10
Cesium-137	(Cs-137)	370	10
Chlorine-36	(Cl-36)	370	10
Chlorine-38	(Cl-38)	370	10
Chromium-51	(Cr-51)	37,000	1,000
Cobalt-57	(Co-57)	3,700	100
Cobalt-58m	(Co-58m)	370	10
Cobalt-58	(Co-58)	370	10
Cobalt-60	(Co-60)	37	1
Copper-64	(Cu-64)	3,700	100
Dysprosium-165	(Dy-165)	370	10
Dysprosium-166	(Dy-166)	3,700	100
Erbium-169	(Er-169)	3,700	100
Erbium-171	(Er-171)	3,700	100
Europium-152	(Eu-152)(9.2h)	3,700	100
Europium-152	(Eu-152)(13 yr)	37	1
Europium-154	(Eu-154)	37	1
Europium-155	(Eu-155)	370	10
Fluorine-18	(F-18)	37,000	1,000
Gadolinium-153	(Gd-153)	370	10
Gadolinium-159	(Gd-159)	3,700	100
Gallium-67	(Ga-67)	3,700	100
Gallium-72	(Ga-72)	370	10
Germanium-68	(Ge-68)	370	10
Germanium-71	(Ge-71)	3,700	100
Gold-195	(Au-195)	370	10
Gold-198	(Au-198)	3,700	100
Gold-199	(Au-199)	3,700	100
Hafnium-181	(Hf-181)	370	10
Holmium-166	(Ho-166)	3,700	100
Hydrogen-3	(H-3)	37,000	1,000
Indium-111	(In-111)	3,700	100
Indium-113m	(In-113m)	3,700	100

Indium-114m	(In-114m)	370	10
Indium-115m	(In-115m)	3,700	100
Indium-115	(In-115)	370	10
Iodine-123	(I-123)	3,700	100
Iodine-125	(I-125)	37	1
Iodine-126	(I-126)	37	1
Iodine-129	(I-129)	3.	0.1
Iodine-131	(I-131)	37	1
Iodine-132	(I-132)	370	10
Iodine-133	(I-133)	37	1
Iodine-134	(I-134)	370	10
Iodine-135	(I-135)	370	10
Iridium-192	(Ir-192)	370	10
Iridium-194	(Ir-194)	3,700	100
Iron-52	(Fe-52)	370	10
Iron-55	(Fe-55)	3,700	100
Iron-59	(Fe-59)	370	10
Krypton-85	(Kr-85)	3,700	100
Krypton-87	(Kr-87)	370	10
Lanthanum-140	(La-140)	370	10
Lutetium-177	(Lu-177)	3,700	100
Manganese-52	(Mn-52)	370	10
Manganese-54	(Mn-54)	370	10
Manganese-56	(Mn-56)	370	10
Mercury-197m	(Hg-197m)	3,700	100
Mercury-197	(Hg-197)	3,700	100
Mercury-203	(Hg-203)	370	10
Molybdenum-99	(Mo-99)	3,700	100
Neodymium-147	(Nd-147)	3,700	100
Neodymium-149	(Nd-149)	3,700	100
Nickel-59	(Ni-59)	3,700	100
Nickel-63	(Ni-63)	370	10
Nickel-65	(Ni-65)	3,700	100
Niobium-93m	(Nb-93m)	370	10
Niobium-95	(Nb-95)	370	10
Niobium-97	(Nb-97)	370	10
Osmium-185	(Os-185)	370	10
Osmium-191m	(Os-191m)	3,700	100
Osmium-191	(Os-191)	3,700	100
Osmium-193	(Os-193)	3,700	100
Palladium-103	(Pd-103)	3,700	100
Palladium-109	(Pd-109)	3,700	100
Phosphorus-32	(P-32)	370	10
Platinum-191	(Pt-191)	3,700	100
Platinum-193m	(Pt-193m)	3,700	100
Platinum-193	(Pt-193)	3,700	100
Platinum-197m	(Pt-197m)	3,700	100
Platinum-197	(Pt-197)	3,700	100
Polonium-210	(Po-210)	3.	0.1
Potassium-42	(K-42)	370	10
Potassium-43	(K-43)	370	10
Praseodymium-142	(Pr-142)	3,700	100
Praseodymium-143	(Pr-143)	3,700	100
Promethium-147	(Pm-147)	370	10
Promethium-149	(Pm-149)	370	10
Rhenium-186	(Re-186)	3,700	100
Rhenium-188	(Re-188)	3,700	100
Rhodium-103m	(Rh-103m)	3,700	100
Rhodium-105	(Rh-105)	3,700	100
Rubidium-81	(Rb-81)	370	10
Rubidium-86	(Rb-86)	370	10
Rubidium-87	(Rb-87)	370	10
Ruthenium-97	(Ru-97)	3,700	100
Ruthenium-103	(Ru-103)	370	10
Ruthenium-105	(Ru-105)	370	10
Ruthenium-106	(Ru-106)	37	1
Samarium-151	(Sm-151)	370	10
Samarium-153	(Sm-153)	3,700	100

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Scandium-46	(Sc-46)	370	10
Scandium-47	(Sc-47)	3,700	100
Scandium-48	(Sc-48)	370	10
Selenium-75	(Se-75)	370	10
Silicon-31	(Si-31)	3,700	100
Silver-105	(Ag-105)	370	10
Silver-110m	(Ag-110m)	37	1
Silver-111	(Ag-111)	3,700	100
Sodium-22	(Na-22)	370	10
Sodium-24	(Na-24)	370	10
Strontium-85	(Sr-85)	370	10
Strontium-89	(Sr-89)	37	1
Strontium-90	(Sr-90)	3.	0.1
Strontium-91	(Sr-91)	370	10
Strontium-92	(Sr-92)	370	10
Sulfur-35	(S-35)	3,700	100
Tantalum-182	(Ta-182)	370	10
Technetium-96	(Tc-96)	370	10
Technetium-97m	(Tc-97m)	3,700	100
Technetium-97	(Tc-97)	3,700	100
Technetium-99m	(Tc-99m)	3,700	100
Technetium-99	(Tc-99)	370	10
Tellurium-125m	(Te-125m)	370	10
Tellurium-127m	(Te-127m)	370	10
Tellurium-127	(Te-127)	3,700	100
Tellurium-129m	(Te-129m)	370	10
Tellurium-129	(Te-129)	3,700	100
Tellurium-131m	(Te-131m)	370	10
Tellurium-132	(Te-132)	370	10
Terbium-160	(Tb-160)	370	10
Thallium-200	(Tl-200)	3,700	100
Thallium-201	(Tl-201)	3,700	100
Thallium-202	(Tl-202)	3,700	100
Thallium-204	(Tl-204)	370	10
Thulium-170	(Tm-170)	370	10
Thulium-171	(Tm-171)	370	10
Tin-113	(Sn-113)	370	10
Tin-125	(Sn-125)	370	10
Tungsten-181	(W-181)	370	10
Tungsten-185	(W-185)	370	10
Tungsten-187	(W-187)	3,700	100
Vanadium-48	(V-48)	370	10
Xenon-131m	(Xe-131m)	37,000	1,000
Xenon-133	(Xe-133)	3,700	100
Xenon-135	(Xe-135)	3,700	100
Ytterbium-175	(Yb-175)	3,700	100
Yttrium-87	(Y-87)	370	10
Yttrium-88	(Y-88)	370	10
Yttrium-90	(Y-90)	370	10
Yttrium-91	(Y-91)	370	10
Yttrium-92	(Y-92)	3,700	100
Yttrium-93	(Y-93)	3,700	100
Zinc-65	(Zn-65)	370	10
Zinc-69m	(Zn-69m)	3,700	100
Zinc-69	(Zn-69)	37,000	1,000
Zirconium-93	(Zr-93)	370	10
Zirconium-95	(Zr-95)	370	10
Zirconium-97	(Zr-97)	370	10

Any radioactive material not listed above other than alpha-emitting radioactive material

3. 0.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.APPENDIX C Groups of Medical uses of Radioactive Materials (Repealed)

(Source: Repealed at 15 Ill. Reg. 10632, effective July 15, 1991)

Section 330.APPENDIX D Limits for Broad Licenses (Section 330.27)

Radioactive Material	Column I		Column II	
	GBq	Ci	GBq	Ci
Antimony-122	37	1	0.37	0.01
Antimony-124	37	1	0.37	0.01
Antimony-125	37	1	0.37	0.01
Arsenic-73	370	10	3.7	0.1
Arsenic-74	37	1	0.37	0.01
Arsenic-76	37	1	0.37	0.01
Arsenic-77	370	10	3.7	0.1
Barium-131	370	10	3.7	0.1
Barium-140	37	1	0.37	0.01
Beryllium-7	370	10	3.7	0.1
Bismuth-210	3.7	0.1	0.037	0.001
Bromine-82	370	10	3.7	0.1
Cadmium-109	37	1	0.37	0.01
Cadmium-115m	37	1	0.37	0.01
Cadmium-115	370	10	3.7	0.1
Calcium-45	37	1	0.37	0.01
Calcium-47	370	10	3.7	0.1
Carbon-14	3,700	100	37	1.
Cerium-141	370	10	3.7	0.1
Cerium-143	370	10	3.7	0.1
Cerium-144	3.7	0.1	0.037	0.001
Cesium-131	3,700	100	37	1
Cesium-134m	3,700	100	37	1
Cesium-134	3.7	0.1	0.037	0.001
Cesium-135	37	1	0.37	0.01
Cesium-136	370	10	3.7	0.1
Cesium-137	3.7	0.1	0.037	0.001
Chlorine-36	37	1	0.37	0.01
Chlorine-38	3,700	100	37	1.
Chromium-51	3,700	100	37	1.
Cobalt-57	370	10	3.7	0.1
Cobalt-58m	3,700	100	37	1.
Cobalt-58	37	1	0.37	0.01
Cobalt-60	3.7	0.1	0.037	0.001
Copper-64	370	10	3.7	0.1
Dysprosium-165	3,700	100	37	1.
Dysprosium-166	370	10	3.7	0.1
Erbium-169	370	10	3.7	0.1
Erbium-171	370	10	3.7	0.1
Europium-152 (9.2 h)	370	10	3.7	0.1
Europium-152 (13 y)	3.7	0.1	0.037	0.001
Europium-154	3.7	0.1	0.037	0.001
Europium-155	37	1	0.37	0.01
Fluorine-18	3,700	100	37	1.
Gadolinium-153	37	1	0.37	0.01
Gadolinium-159	370	10	3.7	0.1
Gallium-72	370	10	3.7	0.1
Germanium-71	3,700	100	37	1.
Gold-198	370	10	3.7	0.1
Gold-199	370	10	3.7	0.1
Hafnium-181	37	1	0.37	0.01
Holmium-166	370	10	3.7	0.1
Hydrogen-3	3,700	100	37	1.
Indium-113m	3,700	100	37	1.
Indium-114m	37	1	0.37	0.01
Indium-115m	3,700	100	37	1.

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Indium-115	37	1	0.37	0.01
Iodine-125	3.7	0.1	0.037	0.001
Iodine-126	3.7	0.1	0.037	0.001
Iodine-129	3.7	0.1	0.037	0.001
Iodine-131	3.7	0.1	0.037	0.001
Iodine-132	370	10	3.7	0.1
Iodine-133	37	1	0.37	0.01
Iodine-134	370	10	3.7	0.1
Iodine-135	37	1	0.37	0.01
Iridium-192	37	1	0.37	0.01
Iridium-194	370	10	3.7	0.1
Iron-55	370	10	3.7	0.1
Iron-59	37	1	0.37	0.01
Krypton-85	3,700	100	37	1.
Krypton-87	370	10	3.7	0.1
Lanthanum-140	37	1	0.37	0.01
Lutetium-177	370	10	3.7	0.1
Manganese-52	37	1	0.37	0.01
Manganese-54	37	1	0.37	0.01
Manganese-56	370	10	3.7	0.1
Mercury-197m	370	10	3.7	0.1
Mercury-197	370	10	3.7	0.1
Mercury-203	37	1	0.37	0.01
Molybdenum-99	370	10	3.7	0.1
Neodymium-147	370	10	3.7	0.1
Neodymium-149	370	10	3.7	0.1
Nickel-59	370	10	3.7	0.1
Nickel-63	37	1	0.37	0.01
Nickel-65	370	10	3.7	0.1
Niobium-93m	37	1	0.37	0.01
Niobium-95	37	1	0.37	0.01
Niobium-97	3,700	100	37	1.
Osmium-185	37	1	0.37	0.01
Osmium-191m	3,700	100	37	1.
Osmium-191	370	10	3.7	0.1
Osmium-193	370	10	3.7	0.1
Palladium-103	370	10	3.7	0.1
Palladium-109	370	10	3.7	0.1
Phosphorus-32	37	1	0.37	0.01
Platinum-191	370	10	3.7	0.1
Platinum-193m	3,700	100	37	1.
Platinum-193	370	10	3.7	0.1
Platinum-197m	3,700	100	37	1.
Platinum-197	370	10	3.7	0.1
Polonium-210	0.37	0.01	0.0037	0.0001
Potassium-42	37	1	0.37	0.01
Praseodymium-142	370	10	3.7	0.1
Praseodymium-143	370	10	3.7	0.1
Promethium-147	37	1	0.37	0.01
Promethium-149	370	10	3.7	0.1
Radium-226	0.37	0.01	0.0037	0.0001
Rhenium-186	370	10	3.7	0.1
Rhenium-188	370	10	3.7	0.1
Rhodium-103m	37,000	1,000	370	10.
Rhodium-105	370	10	3.7	0.1
Rubidium-86	37	1	0.37	0.01
Rubidium-87	37	1	0.37	0.01
Ruthenium-97	3,700	100	37	1.
Ruthenium-103	37	1	0.37	0.01
Ruthenium-105	370	10	3.7	0.1
Ruthenium-106	3.7	0.1	0.037	0.001
Samarium-151	37	1	0.37	0.01
Samarium-153	370	10	3.7	0.1
Scandium-46	37	1	0.37	0.01
Scandium-47	370	10	3.7	0.1
Scandium-48	37	1	0.37	0.01
Selenium-75	37	1	0.37	0.01
Silicon-31	370	10	3.7	0.1

Silver-105	37	1	0.37	0.01
Silver-110m	3.7	0.1	0.037	0.001
Silver-111	370	10	3.7	0.1
Sodium-22	3.7	0.1	0.037	0.001
Sodium-24	37	1	0.37	0.01
Strontium-85m	37,000	1,000	370	10
Strontium-85	37	1	0.37	0.01
Strontium-89	37	1	0.37	0.01
Strontium-90	0.37	0.01	0.0037	0.0001
Strontium-91	370	10	3.7	0.1
Strontium-92	370	10	3.7	0.1
Sulfur-35	370	10	3.7	0.1
Tantalum-182	37	1	0.37	0.01
Technetium-96	370	10	3.7	0.1
Technetium-97m	370	10	3.7	0.1
Technetium-97	370	10	3.7	0.1
Technetium-99m	3,700	100	37	1.
Technetium-99	37	1	0.37	0.01
Tellurium-125m	37	1	0.37	0.01
Tellurium-127m	37	1	0.37	0.01
Tellurium-127	370	10	3.7	0.1
Tellurium-129m	37	1	0.37	0.01
Tellurium-129	3,700	100	37	1.
Tellurium-131m	370	10	3.7	0.1
Tellurium-132	37	1	0.37	0.01
Terbium-160	37	1	0.37	0.01
Thallium-200	370	10	3.7	0.1
Thallium-201	370	10	3.7	0.1
Thallium-202	370	10	3.7	0.1
Thallium-204	37	1	0.37	0.01
Thulium-170	37	1	0.37	0.01
Thulium-171	37	1	0.37	0.01
Tin-113	37	1	0.37	0.01
Tin-125	37	1	0.37	0.01
Tungsten-181	37	1	0.37	0.01
Tungsten-185	37	1	0.37	0.01
Tungsten-187	370	10	3.7	0.1
Vanadium-48	37	1	0.37	0.01
Xenon-131m	37,000	1,000	370	10.
Xenon-133	3,700	100	37	1.
Xenon-135	3,700	100	37	1.
Ytterbium-175	370	10	3.7	0.1
Yttrium-90	37	1	0.37	0.01
Yttrium-91	37	1	0.37	0.01
Yttrium-92	370	10	3.7	0.1
Yttrium-93	37	1	0.37	0.01
Zinc-65	37	1	0.37	0.01
Zinc-69m	370	10	3.7	0.1
Zinc-69	3,700	100	37	1.
Zirconium-93	37	1	0.37	0.01
Zirconium-95	37	1	0.37	0.01
Zirconium-97	37	1	0.37	0.01
Any radioactive material other than source material, special nuclear material, or alpha emitting radioactive material not listed above.	3.7	0.1	0.037	0.001

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

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Section 330.APPENDIX E Schedule E (Repealed)
UNIMPORTANT QUANTITIES OF SOURCE MATERIAL

(Source: Repealed at 10 Ill. Reg. 17315, effective September 25, 1986)

Section 330.APPENDIX F Schedule F (Repealed)
CERTAIN ITEMS CONTAINING BYPRODUCT MATERIAL

(Source: Repealed at 10 Ill. Reg. 17315, effective September 25, 1986)

Section 330.APPENDIX G Financial Surety Arrangements (Section 330.250 (c)(1)(D))

a) Surety Bond. If an applicant or licensee elects to satisfy surety requirements of Section 330.250(c)(1) by filing a surety bond, that bond shall conform to the following requirements:

- 1) The surety company issuing the bond shall, at a minimum, be among those listed as acceptable sureties or reinsurers on federal bonds in Circular 570 of the U.S. Department of Treasury, entitled "Surety Companies Acceptable On Federal Bonds", 52 Fed. Reg. 24601, revised as of July 1, 1987;
- 2) The wording of the surety bond shall contain the provisions specified in subsection (1) of Section 330.Appendix H. Additional conditions may be agreed to between the applicant or licensee and the surety company so long as no requirement of this Part nor other required provision is avoided or altered;
- 3) The surety bond guarantees that:
 - A) Funds will be available to perform reclaiming in accordance with radiation hazards and other requirements of the license for the facility whenever required by the Department;
 - B) Surety waives notification of amendments to licenses, applicable laws, statutes, rules and regulations and agrees that no such amendment shall in any way alleviate its obligation on the bond; and
 - C) The licensee will provide alternate financial surety as specified in Section 330.250(c)(1) and obtain the Division Chief's written approval of the assurance provided within 90 days of receipt by both the licensee and the Division Chief of a notice of cancellation of the bond from the surety;
- 4) Under the terms of the bond the surety shall become liable on the bond obligation when the licensee fails to perform as guaranteed by the bond. Following a determination by the Division Chief that the licensee has failed to so perform, under the terms of the bond the surety shall perform reclaiming to the satisfaction of the State as guaranteed by the bond or shall forfeit the amount of the penal sum, as provided in Section 330.250(c)(1)(C);
- 5) The penal sum of the bond shall be in an amount at least adequate to provide the necessary financial surety;
- 6) Under the terms of the bond, the surety may cancel the bond by sending notice of cancellation by certified mail return receipt requested to the licensee and to the Division Chief. Cancellation shall not occur, however, during the 180 days beginning on the date of receipt of the notice of

cancellation by both the licensee and the Division Chief, as evidenced by the return receipts;

- 7) The surety shall not be liable for the deficiency in the performance of reclaiming after the Division Chief has determined satisfactory reclaiming has occurred;
 - 8) Licensee may terminate the bond by sending written notice to the surety, provided, however, that no such notice shall become effective until the surety receives written authorization from the Division Chief for the termination of the bond.
- b) Personal Bond Supported by a Letter of Credit. If an applicant or licensee elects to satisfy the surety requirements of Section 330.250(c)(1) by filing his personal performance guarantee accompanied by collateral in the form of an irrevocable standby letter of credit, he shall guarantee funds to perform reclaiming in accordance with 32 Ill. Adm. Code 340.Appendix A for protection of health and safety and other requirements of the license for the facility. In addition, the irrevocable standby letter of credit supporting this guarantee shall conform to the following requirements:
- 1) The institution issuing the letter of credit shall be an entity which has the authority to issue letters of credit and whose letter of credit operations are regulated and examined by a Federal or Illinois agency;
 - 2) The wording of the letter of credit shall contain the provisions specified in subsection (a)(2) of Section 330.Appendix H. Additional conditions may be agreed to between the applicant or licensee and the issuing institution so long as no requirement of this Part nor required provision is avoided or altered;
 - 3) The letter of credit shall be accompanied by a letter from the licensee referring to the letter of credit by number, issuing institution and date and providing the following information: the radioactive material license number(s), name(s) and address(es) of the facility(ies) and the amount of funds for each license assured for reclaiming of the facility(ies) by the letter of credit;
 - 4) The letter of credit shall be irrevocable and issued for a period of at least 1 year. The letter of credit shall provide that the expiration date shall be automatically extended for a period of at least 1 year unless, at least 180 days before the current expiration date, the issuing institution notifies both the licensee and the Division Chief by certified mail of a decision not to extend the expiration date. Under the terms of a letter of credit, the 180 days will begin on the date when both the licensee and the Division Chief have received the notice, as evidenced by the return receipts;
 - 5) The letter of credit shall be issued in an amount at least adequate to provide the necessary financial surety; and
 - 6) The Director may draw on the letter of credit upon forfeiture as provided in Section 330.250(c)(1)(C). The Director may also draw on the letter of credit if the licensee does not establish alternate financial surety as specified in this Part and obtain written approval of such alternate assurance from the Division Chief within 90 days after receipt by both the licensee and the Division Chief of a notice from the issuing institution that it has decided not to extend the letter of credit beyond the current expiration date. The Division Chief shall delay the drawing if the issuing institution grants an extension of the term of the credit. During the last

30 days of any extension, the Director will draw on the letter of credit if the licensee has failed to provide alternate financial surety as specified in Section 330.250(c)(1), and obtain written approval of such surety from the Division Chief.

- c) Personal Bond Supported by Insurance. If an applicant or licensee elects to satisfy the surety requirements of Section 330.250(c)(1) by filing his personal performance guarantee accompanied by collateral in the form of an insurance policy, he shall guarantee funds sufficient to perform reclaiming in accordance with 32 Ill. Adm. Code 340.Appendix A for protection of health and safety and other requirements of the licensee for the facility. In addition, the insurance policy supporting this guarantee shall conform to the following requirements:

- 1) The insurer shall be licensed to transact the business of insurance or be eligible to provide insurance as an excess or surplus lines insurer;
- 2) The insurance policy shall be accompanied by a certificate of insurance in which the wording contains the provisions specified in subsection (3) of Section 330.Appendix H. Additional conditions may be agreed to between the applicant or licensee and the insurer so long as no requirement of this Part nor required provision is avoided or altered;
- 3) The insurance policy shall be for a face amount at least adequate to provide the necessary financial surety. The term "face amount" means the total amount the insurer is obligated to pay under the policy. Actual payments by the insurer shall not change the face amount, although the insurer's future liability shall be lowered by the amount of the payments;
- 4) The insurance policy shall guarantee that funds will be available for reclaiming the facility whenever reclaiming is necessary as determined by the Division Chief;
- 5) Upon forfeiture of financial surety as provided in Section 330.250(c)(1)(C), the Director shall direct the insurer to pay the full face amount to the State as specified in Section 330.250(c)(1)(C);
- 6) The licensee shall maintain the policy in full force and effect until license termination or substitution of alternate financial surety as specified in Section 330.250(c)(1). Failure to pay the premium without substitution of alternate financial surety as specified in Section 330.250(c)(1) shall constitute a violation of this Part. Such violation shall be considered to begin upon receipt by the Division Chief of a notice of future cancellation, termination or failure to renew due to nonpayment of the premium, rather than upon the date of expiration;
- 7) The policy shall provide that the insurer shall not cancel, terminate or fail to renew the policy except for failure to pay the premium. The automatic renewal of the policy shall, at a minimum, provide the insured with the option of renewal at the face amount of the expiring policy. If there is a failure to pay the premium, the insurer may elect to cancel, terminate or fail to renew the policy by sending notice by certified mail to the licensee and the Division Chief. Cancellation, termination or failure to renew may not occur, however, during the 180 days beginning with the date of receipt of the notice by both the Division Chief and the licensee, as evidenced by the return receipts. Cancellation, termination or failure to renew shall not occur and the policy shall remain in full force and effect in the event that on or before the date of expiration:

- A) The Division Chief considers the facility abandoned;
- B) The license is terminated or revoked or renewal is denied;
- C) Closure is ordered by the Director or a court of competent jurisdiction;
- D) The licensee is named as debtor in a voluntary or involuntary proceeding under Title II, U.S. Code (Bankruptcy); or
- E) The premium due is paid.

- 8) Commencing on the date that liability to make payments pursuant to the policy accrues, the insurer will thereafter annually increase the face amount of the policy. Such increase shall be equivalent to the face amount of the policy, less any payments made, multiplied by an amount equivalent to 85 percent of the most recent investment rate or of the equivalent coupon-issue yield announced by the U.S. Treasury for 26-week Treasury securities; and
- 9) Any provision of the policy inconsistent with any or all regulations in this Part will be deemed to be amended to eliminate such inconsistency.

- d) Personal Bond Supported by Securities. If an applicant or licensee elects to satisfy the surety requirements of Section 330.250(c)(1) by filing his personal performance guarantee accompanied by collateral in the form of securities, he shall guarantee sufficient funds to perform reclaiming in accordance with

safety and other requirements of the license(s) for the facility(ies). In addition, the securities supporting this guarantee shall be fully registered as to principal and interest in such manner as to identify the State and the Department as holder of such collateral and also identifying that person filing such collateral. The securities shall be accompanied by a certificate whose wording contains the provisions specified in subsection (4) of Section 330.Appendix H, identifying the State and the Department as holder of such collateral and to also identify that person filing such collateral. These securities shall have a current market value at least adequate to provide the necessary financial surety and shall be included among the following types:

- 1) Negotiable United States Treasury securities assigned irrevocably to the State; or
- 2) Negotiable general obligation municipal or corporate bonds which have at least an "A" rating by Moody's and/or Standard and Poor's rating services and which are assigned irrevocably to the State.

- e) Personal Bond Supported by Certificate of Deposit. If an applicant or licensee elects to satisfy the surety requirements of Section 330.250(c)(1) by filing his personal performance guarantee accompanied by a Certificate of Deposit in an amount at least adequate to provide necessary financial surety the irrevocable certificate of deposit supporting this guarantee shall conform to the following requirements:

- 1) The institution issuing the certificate of deposit shall be an entity which has the authority to issue certificates of deposit and whose certificate of deposit operations are regulated and examined by a Federal or State agency;
- 2) The certificate of deposit shall be accompanied by a letter from the licensee referring to the certificate of deposit by number, issuing institution and date and providing the following information:
 - A) The radioactive material license number(s), name(s) and address(es) of the facility(ies) and the amount of funds assured for reclaiming of the facility(ies) by the certificate of deposit. Such certificate of deposit shall also include a statement signed

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by an officer of the issuing financial institution which waives all rights of lien which the institution has or might have against the certificate;

- B) This letter shall contain the applicable provisions specified in subsection (5) of Section 330.Appendix H. Additional provisions may be agreed to between the applicant or licensee and the issuing institution so long as no requirement of this Part or required provision is avoided or altered;
- 3) The certificate of deposit shall be assigned irrevocably to the State and issued for a period of at least 1 year. The certificate of deposit shall provide that the expiration date will be automatically extended for a period of at least 1 year unless, at least 180 days before the current expiration date, the issuing institution notifies both the licensee and the Division Chief by certified mail of a decision not to extend the expiration date. Under the terms of the certificate of deposit, the 180 days will begin on the date when both the licensee and the Division Chief have received the notice, as evidenced by the return receipts; and
- 4) The Director may draw on the certificate of deposit upon forfeiture as provided in Section 330.250(c)(1)(C). The Director will also draw on the certificate of deposit if the licensee does not establish alternate financial surety as specified in this Part and obtain written approval of such alternate assurance from the Division Chief within 90 days after receipt by both the licensee and the Division Chief of a notice from the issuing institution that it has decided not to extend the certificate of deposit beyond the current expiration date. The Director may delay the drawing if the issuing institution grants an extension of the term of the certificate of deposit. During the last 30 days of any such extension, the Director will draw on the certificate of deposit if the licensee has failed to provide alternate financial surety as specified in this Part and obtain written approval of such surety from the Division Chief.

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.APPENDIX H Wording of Financial Surety Arrangements (Section 330.250(c)(1)(E))

- 1) A surety bond guaranteeing funds for reclaiming, as specified in subsection (a) of Section 330.Appendix G, shall contain the following provisions except that the instructions in parentheses are to be replaced with the relevant information and the parentheses deleted:

SURETY BOND

Date bond executed: _____

Effective date: _____

Principal: (legal name and business address of applicant or licensee)

Type of organization: (insert "individual," "joint venture," "partnership" or "corporation")

State of incorporation: _____

Surety(ies): (Name(s) and business address(es))

License Number(s), name, address and reclaiming cost for each facility guaranteed by this bond: _____

Total penal sum of bond: \$ _____

Surety's bond number: _____

KNOW ALL PERSONS BY THESE PRESENTS, that we, the Principal and Surety(ies) hereto are firmly bound to the Illinois Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, Illinois 62704, (hereinafter called Department), in the above penal sum for the payment of which we bind ourselves, our heirs, executors, administrators, successors and assigns jointly and severally; provided that, where the Surety(ies) are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety, but if no limit of liability is indicated, the limit of liability shall be the full amount of the penal sum.

WHEREAS said Principal is required, under the Radiation Protection Act of 1990, as amended, to have a license in order to receive, possess, store and use radioactive material at the facility identified above; and

WHEREAS said Principal is required to provide financial assurance for reclaiming as a condition of the license;

NOW, THEREFORE, the conditions of this obligation are such that if the Principal shall faithfully perform reclaiming, whenever required to do so, of each facility for which this bond guarantees funds for reclaiming, to the satisfaction of the Director, Illinois Department of Nuclear Safety, in accordance with acceptable practices for protection of health and safety pursuant to all applicable laws, statutes, rules and regulations, as such laws, statutes, rules and regulations may be amended.

OR, if the Principal shall provide alternate financial assurance as specified in Section 330.250(c)(1)(H), and obtain the written approval of such assurance from the Chief, Division of Radioactive Materials (hereinafter called the Division Chief), within 90 days after the date notice of cancellation is received by both the Principal and the Division Chief from the surety(ies), then this obligation shall be null and void; otherwise, it is to remain in full force and effect.

The Surety(ies) shall become liable on this bond obligation only when the Principal has failed to fulfill the conditions described above.

Upon notification by the Division Chief that the Principal has been found in violation of the reclaiming requirements of the Department, for a facility for

which this bond guarantees funds for performance of reclaiming, the Surety(ies) shall forfeit the reclaiming cost amount guaranteed for the facility to the Department as directed by the Director.

Upon notification by the Division Chief that the Principal has failed to provide alternate financial assurance as specified in Section 330.250(c)(1)(H), and obtain written approval of such assurance from the Division Chief during the 30 days following receipt by both the Principal and the Director of a notice of cancellation of the bond, the Surety(ies) shall forfeit funds in the amount guaranteed for the facility(ies) to the Department as directed by the Director.

The Surety(ies) hereby waive(s) notification of amendments to licenses, applicable laws, statutes, rules and regulations and agree(s) that no such amendment shall in any way alleviate its (their) obligation on this bond.

The liability of the Surety(ies) shall not be discharged by any payment or succession of payments hereunder, unless and until such payment or payments shall amount in the aggregate to the penal sum of the bond, but in no event shall the obligation of the Surety(ies) hereunder exceed the amount of said penal sum.

The Surety(ies) may cancel the bond by sending notice of cancellation by certified mail to the applicant or licensee and to the Division Chief; provided, however, that cancellation shall not occur during the 180 days beginning on the date of receipt of the notice of cancellation by both the Principal and the Division Chief, as evidenced by the return receipts.

The Principal may terminate this bond by sending written notice to the Surety(ies); provided, however, that no such notice shall become effective until the Surety(ies) receive(s) written authorization for termination of the bond by the Division chief.

IN WITNESS WHEREOF, the Principal and Surety(ies) have executed this SURETY BOND and have affixed their seals on the date set forth above.

The persons whose signatures appear below hereby certify that they are authorized to execute this surety bond on behalf of the Principal and Surety(ies).

PRINCIPAL

(Signature(s))
(Name(s))
(Title(s))
Corporate seal:

CORPORATE SURETY(IES)

(Name and address)
State of incorporation: _____
Liability limit: \$ _____

(Signature(s))
(Name(s))
(Title(s))

Corporate seal:

(For every co-surety, provide signature(s), corporate seal and other information in the same manner as for the Surety above.)

Bond premium: \$ _____

- 2) A letter of credit, as specified in subsection (b) of Section 330. Appendix G, shall contain the following provisions except that instructions in parentheses are to be replaced with the relevant information and the parentheses deleted:

IRREVOCABLE STANDBY LETTER OF CREDIT

Chief _____ Date: _____
Division of Radioactive Materials
Illinois Department of Nuclear Safety

Dear Sir or Madam:

We hereby establish our Irrevocable Standby Letter of Credit No. _____ in your favor, at the request and for the account of (applicant's or licensee's name and address) up to the aggregate amount of (in words) U.S. dollars \$ _____, available upon presentation of:

- A) your sight draft, bearing reference to this Letter of Credit No. _____; and
B) your signed statement reading as follows: "I certify that the amount of the draft is payable pursuant to regulations issued under authority of the Illinois Radiation Protection Act of 1990, as amended."

This letter of credit is effective as of (date) and shall expire on (date at least 1 year later), but such expiration date shall be automatically extended for a period of (at least 1 year) on (date) and on each successive expiration date, unless, at least 180 days before the current expiration date, we notify both you and (applicant's or licensee's name) by certified mail that we have decided not to extend this letter of credit beyond the current expiration date. In the event you are so notified, any unused portion of the credit shall be available upon presentation or your sight draft for 180 days after the date of receipt by both you and (licensee's name), as shown on the signed return receipts.

Whenever this letter of credit is drawn on, under and in compliance with the terms of this credit, we shall duly honor such draft upon presentation to us, and we shall forfeit the amount of the draft to the State of Illinois in accordance with your instructions.

(Signature(s) and title(s) of official(s) of issuing institution) (Date)

This credit is subject to (the most recent edition of the Uniform Customs and Practice for Documentary Credits, published by the International Chamber of Commerce, or the Uniform Commercial Code).

- 3) A certificate of insurance, as specified in subsection (c) of Section 330. Appendix G, shall contain the following provisions except that instructions in parentheses are to be replaced with the relevant information and the parentheses deleted:

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CERTIFICATE OF INSURANCE FOR RECLAIMING

Name and Address of Insurer
(herein called the "Insurer"): _____
Name and Address of Insured
(herein called the "Insured"): _____
Facilities covered: (List for each facility: The License Number, name, address and the amount of insurance for reclaiming (these amounts for all facilities covered shall total the face amount shown below)).

Face Amount: _____
Policy Number: _____
Effective Date: _____

The Insurer hereby certifies that it has issued to the Insured the policy of insurance identified above to provide financial surety for reclaiming the facilities identified above. The Insurer further warrants that such policy conforms in all respects with the requirements of subsection (c) of Section 330.Appendix G, as applicable and as such regulations were constituted on the date shown immediately below. It is agreed that any provision of the policy inconsistent with such regulation is hereby amended to eliminate such inconsistency.

Whenever requested by the Chief, Division of Radioactive Materials, Illinois Department of Nuclear Safety, the Insurer agrees to furnish to the Chief, Division Radioactive Materials, a duplicate original of the policy listed above, including all endorsements thereon.

(Authorized signature for Insurer)
(Name of person signing)
(Title of person signing)
Signature of witness or notary: _____
(Date)

- 4) A personal bond supported by securities, as specified in subsection (d) of Section 330.Appendix G, shall be accompanied by a document which contains the following provisions except that the instructions in parentheses are to be replaced with relevant information and the parentheses deleted:

ASSIGNMENT OF SECURITIES

Pursuant to 32 Ill. Adm. Code 330.250(c), (licensee or applicant's name) hereby transfers () Dollars (\$) in negotiable United States Treasury Securities unto Illinois Department of Nuclear Safety, including interest which thereby accrues, represented by Certificate No. (), herewith and does hereby agree that such securities shall be used for purposes of ensuring reclamation of (name of facility) site.

- 5) A certificate of deposit, as specified in subsection (e) of Section 330.Appendix G, shall contain the following provisions except that instructions in parentheses are to be replaced with the relevant information and the parentheses deleted:

Name and address of Bank

Certificate of Deposit ___, 19__
No. _____ \$ _____

(Licensee name and address) has deposited not subject to check () Dollars (\$) payable to the order of Illinois Department of Nuclear Safety, Chief, Division of Radioactive Materials, () days after notice in writing of intended withdrawal shall have been given to the bank and upon surrender of this certificate properly endorsed, with interest as herein provided.

This certificate shall be automatically renewed at maturity for successive periods of 1 year each. The bank reserves the right not to renew this certificate at the expiration of any 1 year's period upon mailing to the payee, at least 180 days prior to the expiration date, a notice of its election not to renew the certificate.

(Cashier)

Dated _____, 19__.

(Licensee or Applicant)
Guaranteed
By: _____
(Title)

ASSIGNMENT OF CORPORATE OR MUNICIPAL BOND

Pursuant to 32 Ill. Adm. Code 330.250(c), (licensee or applicant's name) hereby transfers to Illinois Department of Nuclear Safety bonds of the (Corporation or Municipality's name) for () Dollars (\$), No. () herewith standing in the name of the undersigned on the books of said (Corporation or Municipality) and does hereby agree that such bonds shall be used for purposes of ensuring reclaiming of (name of facility) site.

_____, 19__.

(Licensee or Applicant)
Signature Guaranteed
By _____
(Title)

(Source: Amended at 18 Ill. Reg. 5553, effective March 29, 1994)

Section 330.TABLE A Group I (Repealed)

(Source: Repealed at 10 Ill. Reg. 17315, effective September 25, 1986)

Section 330.TABLE B Group II (Repealed)

(Source: Repealed at 10 Ill. Reg. 17315, effective September 25, 1986)

Section 330.TABLE C Group III (Repealed)

(Source: Repealed at 10 Ill. Reg. 17315, effective September 25, 1986)

Section 330.TABLE D Group IV (Repealed)

(Source: Repealed at 10 Ill. Reg. 17315, effective September 25, 1986)

Section 330.TABLE E Group V (Repealed)

(Source: Repealed at 10 Ill. Reg. 17315, effective September 25, 1986)

Section 330.TABLE F Group VI (Repealed)

(Source: Repealed at 10 Ill. Reg. 17315, effective September 25, 1986)

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

PART 331
FEES FOR RADIOACTIVE MATERIAL
LICENSES

Section	
331.10	Purpose
331.20	Scope
331.30	Definitions
331.110	Exemptions
331.120	Payment of Fees
331.130	Refunds
331.200	Full Cost of Review
331.210	Schedule of Fees For Radioactive Material Licenses (Repealed)
331.310	Failure By Applicant or Licensee To Pay Prescribed Fee
APPENDIX A	Schedule of License Fees (Repealed)
<tTABLE A	License Fees - Jan. 1, 1988 - Dec. 31, 1988 (Repealed)
<tTABLE B	License Fees - Jan. 1, 1989 - Dec. 31, 1989 (Repealed)
<tTABLE C	License Fees - Jan. 1, 1990 - Dec. 31, 1990 (Repealed)
APPENDIX B	Fee Schedule For Radioactive Material Licenses (Repealed)
APPENDIX C	Fee Schedule For Sealed Source And Device Evaluations (Repealed)
APPENDIX D	Fee Schedule For Radioactive Material Licenses

AUTHORITY: Implementing and authorized by Section 11 of the Radiation Protection Act of 1990 420 ILCS 40/11 .

SOURCE: Adopted at 10 Ill. Reg. 17239, effective September 25, 1986; amended at 11 Ill. Reg. 20570, effective January 1, 1988; amended at 15 Ill. Reg. 90, effective January 1, 1991; amended at 16 Ill. Reg. 11479, effective July 7, 1992; amended at 18 Ill. Reg. 12131, effective August 1, 1994.

Section 331.10 Purpose

This Part establishes the fees charged for radioactive material licenses, and sealed source and device evaluations conducted in support of radioactive material licenses issued by the Illinois Department of Nuclear Safety (the Department).

(Source: Amended at 18 Ill. Reg. 12131, effective August 1, 1994)

Section 331.20 Scope

Except for persons who apply for or hold only licenses exempted in Section 331.110, this Part applies to any person who is an applicant for, or holder of, a radioactive material license issued pursuant to issued to a radioactive material licensee.

(Source: Amended at 18 Ill. Reg. 12131, effective August 1, 1994)

Section 331.30 Definitions

The following definitions are applicable for use in this Part only. Additional definitions for use in this Part are located in 32 Ill. Adm. Code 310.20.

"Application" means a request filed with the Department for a license, amendment, amendment to terminate a license, renewal, sealed source or device evaluation, amendment to a sealed source or device evaluation or an exemption granted by the Department pursuant to 32 Ill. Adm. Code: Chapter II.

"Amendment" means a modification in the license document that reflects changes to a radiation safety program or a sealed source or device evaluation which do not meet the criteria of a minor amendment.

"Amendment fee" means fees assessed for modifying a previously approved sealed source or device evaluation, or for modifying a license to increase the number of permanent jobsites listed on the license, to add a new material use category or to change the radiation safety program at a licensed facility. For licenses based on the full cost of review "Amendment fees" do not include the fee associated with processing a "minor amendment".

AGENCY NOTE: For licenses based on fixed fees, there is no fee assessed for amendments to change the radiation safety program. The cost to the Department for processing such amendments is incorporated into the fixed license fee. For licenses based on fixed cost, fees for adding additional jobsites or for adding additional material use categories are assessed in accordance with Section 331.120.

"Category I irradiator" means a gamma irradiator in which the sealed source is completely contained in a dry container constructed of solid material, the sealed source is shielded at all times, and human access to the sealed source and the volumes undergoing irradiation is not physically possible because of the design of the irradiator.

"Category II irradiator" means a controlled human access gamma irradiator in which the sealed source is contained in a dry container constructed of solid materials, is fully shielded when not in use and is exposed within a radiation volume that is maintained inaccessible during use by an entry control system.

"Category III irradiator" means a gamma irradiator in which the sealed source is contained in a storage pool (usually containing water), the sealed source is shielded at all times, and human access to the sealed source and the volume undergoing irradiation is physically restricted in its design configuration and proper mode of use.

"Category IV irradiator" means a controlled human access gamma irradiator in which the sealed source is contained in a storage pool (usually containing water), if fully shielded when not in use and is exposed within a radiation volume that is maintained inaccessible during use by an entry control system.

"Confirmatory environmental monitoring" means those surveys conducted by the Department either to establish whether the licensee has complied with the concentrations and exposure limits specified in 32 Ill. Adm. Code 332, 340, 601 or 606, or to provide data to evaluate potential health and environmental impacts resulting from licensed activities.

"Dispensing" means to remove aliquots of radioactive material from bulk stock and distribute portions to another licensee or to a person exempt from licensure.

"Distribution" means the transfer of radioactive material to three or more licensees or persons exempt from licensure pursuant to 32 Ill. Adm. Code 330 or 332.

"Educational institution" means a non-profit organization which has as its primary purpose the advancement of knowledge in one or more specific fields and which is accredited by the North Central Association of Colleges and Schools.

"Evaluation fees" means fees assessed for evaluation of new sealed sources or devices.

"License fees" means fees for new radioactive material licenses or renewal of existing radioactive material licenses as specified in 32 Ill. Adm. Code 330.330, 332.120 or 601.130.

"Manufacture" means the dispensing or processing of radioactive material or the assembly of radioactive material as sealed sources into devices.

"Materials license" means a radioactive material license issued pursuant to 32 Ill. Adm. Code 330, 332 or 601.

"Material use category" means the category described in Appendix D that represents the use of radioactive material authorized by the license or the requested authorized use submitted by the applicant.

"Minor amendment" means changes to a radiation safety program which are administrative in nature, such as changing the name of the Radiation Safety Officer or changing the users specified on a radioactive material license. A fee is charged for minor amendments to licenses when the initial license fee is based on full cost of review.

AGENCY NOTE: Although all licensees are required to obtain amendments prior to instituting administrative changes in the radiation safety program, no fee is assessed for minor amendments to licenses for which a fixed fee is prescribed in Appendix D. The cost to the Department of processing minor amendments to such licenses is incorporated in the initial license fee.

"Permanent jobsite" means any location where licensed material is stored or used for more than 180 days during any consecutive 12 months.

"Processing" means the preparation, manipulation or conversion of radioactive material.

"Temporary jobsite" means any location where licensed material is used or stored for 180 days or less during any consecutive 12 months.

"Treatment" means any method, technique or process, including storage for radioactive decay, designed to change the physical, chemical or biological characteristics or composition of any waste in order to render the waste safer for transport, storage or disposal, amenable to recovery, convertible to another usable material or reduced in volume. 420 ILCS 20/3

(Source: Amended at 18 Ill. Reg. 12131, effective August 1, 1994)

Section 331.110 Exemptions

No fees as described in Section 331.120 shall be required for:

- a) A general license issued pursuant to 32 Ill. Adm. Code 330.210, 330.220(a), (b), (c), (d), (e), (g) or 330.900(a)(2) and (b)(2).
- b) A license for possession and use of radioactive material issued to an agency of a state, county, or municipal government or any political subdivision thereof. This exemption does not apply to licenses for which the license fee is based on full cost, licenses which authorize distribution of radioactive material or licenses authorizing services to any person other than an agency or political subdivision of the state, county, or municipal government.
- c) A license for possession and use of radioactive material issued to an educational institution as defined in Section 331.30. This exemption does not apply to licenses that authorize human use or remunerated services to others.
- d) An application to amend a materials license for which the license fee is not based on full cost, that would not change the material use category or add additional permanent jobsites.
- e) A license authorizing the use of source material as shielding only in devices and containers, provided, however, that all other licensed material in the device or container will be subject to the fees prescribed in Appendix D of this Part.
- f) An application to change the status of a sealed source or device evaluation from "active" to "inactive". For purposes of this exemption, a sealed source or device evaluation is designated "active" if new sources or devices are being manufactured and/or distributed for use. An evaluation is designated "inactive" when such sources and devices are no longer manufactured for commercial distribution.

(Source: Amended at 18 Ill. Reg. 12131, effective August 1, 1994)

Section 331.120 Payment of Fees

Fees for licensing actions and for evaluations of sealed sources and devices shall be assessed and paid as follows:

- a) For licenses that Appendix D specifies as being assessed a fixed cost license fee, fees shall be assessed for application for new licenses, amendments to add or change material use categories, amendments to increase the number of permanent jobsites and renewals of existing licenses. Fixed cost license fees shall be assessed as follows:
 - 1) Unless a license or amendment is exempt under Section 331.110, or the license fee is to be based on full costs (see Appendix D), each application for which a fixed fee is prescribed in Appendix D of this Part shall be accompanied by a remittance in the full amount of the fee. No application will be processed prior to payment of the full amount specified.
 - 2) For applications covering only one material use category, the prescribed fee shall be the fee for the appropriate category as specified in Appendix D. For licenses covering more than one material use category, the fee shall be 100% of the highest fee for a material use category for which a fee is due, plus 30% of the fee listed for each other material use category for which a fee is due.
 - 3) Multiple use locations: For additional permanent jobsites where radioactive material is stored or used under the same license, the applicant must submit 20% of the applicable material use category fee for each additional site. The total additional fee submitted for multiple use locations shall not

exceed 100% of the application fee for that material use category.

- 4) The license fees listed in Appendix D are assessed for the term of the license.
 - 5) A licensee requesting renewal of a license shall pay the license fees specified in Appendix D that will be in effect upon the expiration date of the license. Applications for new licenses or amendments will be assessed fees specified in Appendix D based upon the date the application is received in the Department.
 AGENCY NOTE: Although 32 Ill. Adm. Code 330.330 requires licensees to request renewal of a license not less than 30 days prior to the expiration of the existing license, renewal fees will be calculated based upon the fees in effect on the expiration date of the license.
 - 6) An educational institution (as defined in Section 331.30) that seeks or has a license authorizing possession and use of radioactive material for human use or remunerated services to others shall pay 100% of the highest fee category for which a fee is due. For licenses covering more than one human use or remunerated service category, the fee shall be 100% of the highest fee for a material use category for which a fee is due, plus 30% of the fee listed for each other material use category for which a fee is due. This fee will be assessed beginning with the first licensing action taken after August 1, 1994.
- b) For licenses that Appendix D specifies are to be assessed fees based on full cost of review, fees shall be assessed for all evaluations, inspections, amendments (including minor amendments and amendments to terminate a license) and for monitoring of unlicensed properties contaminated with byproduct material (as defined in 32 Ill. Adm. Code 332.20) and assessing the decommissioning and decontamination activities at such properties. Fees based on full cost license reviews shall be paid as follows:
- 1) For license categories based on full cost review, the licensee will be billed quarterly or when the Department has incurred unpaid full cost expenses (as defined in Section 331.200(c)) in excess of the amount of the deposit, whichever is earlier. Each bill will identify the applications and the costs related to each. Payment is due within 45 days of receipt of the bill.
 - 2) For the first application, other than an application for a minor amendment, received from a licensee after August 1, 1994, for which Appendix D specifies that the review charges are based on full costs, the applicant shall submit the deposit prescribed in Appendix D of this Part. Licensees that already have adequate deposits on file with the Department are not required to resubmit a deposit. The licensee will be billed quarterly or when the Department has incurred unpaid full cost expenses (as defined in Section 331.200(c)) in excess of the amount of the deposit, whichever is earlier. Each bill will identify the applications and the costs related to each. Payment is due within 45 days of receipt of the bill.
 - 3) Applications for minor amendments to licenses subject to full cost reviews as specified in Appendix D, shall pay those fees identified as minor amendment fees at the time the amendment is filed with the Department.
- c) For evaluations of new sealed sources and devices, and amendments to existing sealed sources and device

evaluations, fees shall be assessed based on the full cost of review. Each application for an evaluation of a new sealed source or device, or for an amendment to an existing sealed source or device evaluation, shall be accompanied by a deposit in the amount of \$500.00. The applicant will be billed or issued a refund upon the completion of the review. Each bill will identify the applications and the costs related to each. Payment is due within 45 days of receipt of the bill.

d) Adding material use categories:

- 1) An application for amendment to a materials license that would add a material use category with a lower license fee must be accompanied by the total fee due for each new material use category as determined by the following formula:

$$F = 0.06 * N * L$$

where

F = Total fee due.

N = Number of years remaining on the license (partial years count as one full year in this calculation).

L = License fee for the new material use category.

- 2) An application for amendment to a materials license that would add a material use category with a higher fee must be accompanied by the total fee due as determined by the following formula:

$$F = (0.2 * H * N) - (0.14 * L * N)$$

where

F = Total fee due.

N = Number of years remaining on the license (partial years count as one full year in this calculation).

H = Higher fee required by new material use category.

L = Highest license fee for a material use category currently authorized by the license.

- e) Adding multiple use locations: An application for amendment to a materials license that would increase the number of permanent jobsites must be accompanied by the total fee due as determined by the following formula:

$$F = 0.04 * H * N * J$$

where

F = Total fee due.

N = Number of years remaining on the license (partial years count as one full year in this calculation).

H = The highest material use category applicable to the intended use of material at the new permanent jobsite.

J = The number of permanent jobsites to be added. If there are 5 or more permanent jobsites, then J is equal to 5.

AGENCY NOTE: Although a licensee may have more than 5 permanent jobsites, the maximum additional fee for multiple permanent jobsites is the license fee for the highest material use category applicable at the permanent jobsite.

- f) Reciprocity fees: Each application for reciprocal recognition of an out-of-state license under 32 Ill. Adm. Code 330.900(a)(1) or (b)(1) shall be accompanied by a remittance of 20% of the license fee for the applicable material use category indicated in Appendix D of this Part. However, such fee is not required if the applicant has paid to the Department a reciprocity fee for that license within 12 months prior to the date of commencement of the proposed activity and the proposed activity will not extend past 12 months from the receipt of the reciprocity fee the applicant has paid.
- g) Fee payments: Payments shall be by check or money order made payable to the Illinois Department of Nuclear Safety.

Ch. II, Sec. 331.120

(Source: Amended at 18 Ill. Reg. 12131, effective August 1, 1994)

Section 331.130 Refunds

The following rules will be followed by the Department when calculating refunds to licensees and applicants for materials licenses:

- a) For licenses for which a fixed fee is prescribed in Appendix D, in the event that the Department terminates a license at the request of the licensee prior to the expiration date, the Department will issue a prorated refund of the license fees for each remaining full year for which the license fee was paid.
- b) For licenses for which a fixed fee is prescribed in Appendix D, in the event that the applicant withdraws, or the Department abandons or denies an application prior to issuance of the license document, the Department will issue a refund totalling 80% of the total fee submitted for that license action.
- c) For licenses for which the license fee is based on full cost review, and for applications for sealed source and device evaluations, in the event that the applicant withdraws, or abandons, or the Department denies an application prior to issuance of the evaluation sheet or initial license, the Department will issue a refund totalling the deposit submitted for that application minus the full cost expenses incurred but not paid by the applicant. In the event the expenses incurred exceed the deposit, the applicant will be billed for the unpaid balance of full cost expenses as defined in Section 331.200. Each bill will identify the application and the related costs. Payment is due within 45 days of receipt.
- d) For licenses for which the fee is based on full cost review, and for sealed source and device evaluations, upon termination of the license or issuance of a sealed source or device evaluation sheet, the Department will issue a refund totalling the deposit submitted, minus any outstanding full cost expenses. In the event that expenses incurred exceed the deposit, the applicant will be billed for the unpaid balance of full cost expenses as defined in Section 331.200. Each bill will identify the applications and the related costs. Payment is due within 45 days of receipt.

(Source: Amended at 18 Ill. Reg. 12131, effective August 1, 1994)

Section 331.200 Full Cost of Review

Fees for licenses, amendments, amendments to terminate a license, renewals, evaluations for new sealed sources and devices and amendments to existing sealed source and device evaluations, which are to be based on the full cost of review will be calculated based on the following:

- a) The time required by Departmental professional staff to conduct the review, including license file review, travel time, correspondence preparation and supervisory and management review of specific actions, multiplied by the rate of \$90.00 per hour;
- b) The time required by Departmental professional staff to conduct inspections or perform confirmatory environmental monitoring, including license file review, travel time, correspondence preparation and supervisory and management review of specific actions, multiplied by the rate specified in subsection (a) above;
- c) For licenses authorizing the possession and use of source material (as defined in 32 Ill. Adm. Code 310.20) and byproduct material (as defined in

decontamination activities at unlicensed properties contaminated with byproduct material, including, but not limited to, travel time,

correspondence preparation, supervisory and management review of specific actions, multiplied by the rate specified in subsection (a) above;

- d) The cost of standard lab equipment and supplies, special environmental monitoring equipment and servicing of such equipment; and
- e) The contractual support service costs, if any, incurred by the Department in conjunction with the review, inspections and confirmatory environmental monitoring activities.
AGENCY NOTE: These support service costs may include, but are not limited to, rental of specialized equipment, acquisition of additional professional expertise not available within the Department and laboratory fees charged to the Department.

(Source: Amended at 18 Ill. Reg. 12131, effective August 1, 1994)

Section 331.210 Schedule of Fees For Radioactive Material Licenses (Repealed)

(Source: Repealed at 15 Ill. Reg. 90, effective January 1, 1991)

Section 331.310 Failure By Applicant or Licensee To Pay Prescribed Fee

In any case where the Department finds that an applicant or a licensee has failed to pay a prescribed fee required in this Part, the Department will not process the application and will return the application to the applicant with an explanation that the application is being returned because fees have not been paid. In addition, the Department will have the authority to suspend or revoke, in accordance with 32 Ill. Adm. Code 330.500, any license issued to the applicant or licensee if all required license fees have not been paid.

(Source: Amended at 15 Ill. Reg. 90, effective January 1, 1991)

Section 331.APPENDIX A Schedule of License Fees (Repealed)**Section 331.TABLE A License Fees - Jan. 1, 1988 - Dec. 31, 1988 (Repealed)**

(Source: Repealed at 16 Ill. Reg. 11479, effective July 7, 1992)

Section 331.TABLE B License Fees - Jan. 1, 1989 - Dec. 31, 1989 (Repealed)

(Source: Repealed at 16 Ill. Reg. 11479, effective July 7, 1992)

Section 331.TABLE C License Fees - Jan. 1, 1990 - Dec. 31, 1990 (Repealed)

(Source: Repealed at 16 Ill. Reg. 11479, effective July 7, 1992)

Section 331.APPENDIX B Fee Schedule For Radioactive Material Licenses (Repealed)

(Source: Repealed at 18 Ill. Reg. 12131, effective August 1, 1994)

Section 331.APPENDIX C Fee Schedule For Sealed Source And Device Evaluations (Repealed)

(Source: Repealed at 16 Ill. Reg. 11479, effective July 7, 1992)

Ch. II, Sec. 331.APPENDIX D

Section 331.APPENDIX D Fee Schedule For Radioactive Material Licenses

MATERIAL USE CATEGORIES

FEE PAYABLE:

August 1, 1994

101

Radioactive Material (as defined in 32 Ill. Adm. Code 310.20)

- A. Type A Broad Scope Manufacturing and/or Distribution - licenses (as specified in 32 Ill. Adm. Code 330.270) for possession and use of radioactive material for processing or manufacturing radioactive material or items containing radioactive material for commercial distribution, including, but not limited to, manufacturing of a chemical mixture, compound, solution or alloy which is listed in 32 Ill. Adm. Code 330.30:

License Fee: \$19,529

- B. Other Manufacturing and/or Distribution - licenses for possession and use of radioactive material and for processing or manufacturing radioactive material or items containing radioactive material for commercial distribution, including, but not limited to, manufacturing of a chemical mixture, compound, solution or alloy which is listed in 32 Ill. Adm. Code 330.30:

License Fee: \$10,498

- C. Distribution - licenses authorizing distribution of radioactive material or items containing radioactive material, not involving processing or manufacturing of radioactive material:

License Fee: \$ 3,583

- D. Category I Irradiator - licenses for possession and use of radioactive material as sealed sources in a Category I irradiator:

License Fee: \$ 1,865

- E. Category II, III or IV Irradiator - licenses for possession and use of less than 10,000 curies of radioactive material as sealed sources in a Category II, Category III or Category IV irradiator:

License Fee: \$ 6,093

- F. Category II, III or IV Irradiator - licenses for possession and use of 10,000 curies or more of radioactive material as sealed sources in a Category II, Category III or Category IV irradiator:

License Fee: \$11,932

- G. Type A Broad Scope Research and Development - licenses (as specified in 32 Ill. Adm. Code 330.270) for possession and use of radioactive material for research and development that do not authorize commercial distribution:

License Fee: \$ 5,017

- H. Other Research and Development - licenses for possession and use of radioactive material for research and development that do not authorize commercial distribution:

License Fee: \$ 3,886

- I. Services - licenses that authorize services for other licensees, including, but not limited to, leak testing, instrument calibration and sample analysis, but not including waste disposal transportation or radioactive waste broker services:

License Fee: \$ 5,226

- J. Gas Chromatographs and X-Ray Fluorescence Analyzers - licenses for possession and use of radioactive material in sealed sources or detector cells for use in gas chromatographs and x-ray fluorescence analyzers:

License Fee: \$ 1,440

- K. Other - all other specific radioactive material licenses not specified elsewhere in this fee schedule, including, but not limited to, licenses for possession and use of radioactive material in sealed sources for use in fixed and portable guages:

License Fee: \$ 3,567

102

Wireline Service Operations (as defined in 32 Ill. Adm. Code 351)

- A. Wireline Service Operations - licenses specifically authorizing use of radioactive material for wireline services, well surveys and tracer studies other than field flooding tracer studies:

License Fee: \$ 4,749

- B. Field Flood Studies - licenses specifically authorizing use of radioactive material for wireline services, well surveys, tracer studies or field flood tracer studies:

License Fee: \$ 9,498

103

Industrial Radiography (as defined in 32 Ill. Adm. Code 350)

Industrial Radiography at Permanent and Temporary Jobsites - licenses specifically authorizing use of radioactive material for industrial radiography at permanent or temporary jobsites:

License Fee: \$12,004

104

Human use of radioactive material

- A. Type A Broad Scope Medical and Teletherapy - licenses (as specified in 32 Ill. Adm. Code 330.270) authorizing human use of radioactive material, including research and development, including use of radioactive material in sealed sources contained in teletherapy devices for human use of radioactive material and for the irradiation of other items:

License Fee: \$ 9,135

- B. Teletherapy - licenses for possession and use of radioactive material as sealed sources contained in teletherapy devices for medical use of radioactive material and for the irradiation of other items:

License Fee: \$ 6,002

- C. Medical Use - licenses for human use of radioactive material, except license for radioactive material in sealed sources contained in teletherapy devices and Type A specific license of broad scope:

License Fee: \$ 4,944

- D. Diagnostic Medical Use - Licenses restricted to only the diagnostic human use of radioactive material listed in 32 Ill. Adm. Code 335.SUBPART D: UPTAKE, DILUTION AND EXCRETION; SUBPART E: IMAGING AND LOCALIZATION;1SUBPART G: SEALED SOURCES FOR DIAGNOSIS; and in vitro kits, except as specified in 32 Ill. Adm. Code 330.220(f):

License Fee: \$ 3,567

- E. Limited Medical Use - licenses restricted to only the human use of radioactive material specified in 32 Ill. Adm. Code 335.SUBPART D: UPTAKE, DILUTION AND EXCRETION:

License Fee: \$ 895

105

General Licenses

General licenses (as specified in 32 Ill. Adm. Code 330.220(f))

License Fee: \$ 746

106

Source Material (as defined in 32 Ill. Adm. Code 310.20) and Byproduct Material (as defined in 32 Ill. Adm. Code 332.20)

- A. Possession and Use of Source and Byproduct Material - licenses for possession and use of source material in recovery operations such as milling, in-situ leaching, heap-leaching, ore buying stations, ion exchange facilities and in processing of ores containing source material for extraction of metals other than uranium or thorium, including licenses authorizing the possession of byproduct waste material (tailings) from source material recovery operations as well as licenses authorizing the possession and maintenance of a facility in a standby mode:

License/Amendment Fee: \$25,000 Deposit

Minor Amendment Fee: \$ 360

- B. Possession and use of source material - licenses for possession and use of source material that require a specific radioactive materials license. This does not include licenses authorizing manufacture and distribution of source material. This does not include specific licenses authorizing source material used for shielding or source material authorized for use in manufacturing operations as described in Material Use Categories 101A and B:

License/Amendment Fee: \$25,000 Deposit

Minor Amendment Fee: \$ 360

107

Radioactive Waste

- A. Low-Level Radioactive Waste Disposal Facilities - licenses issued pursuant to 32 Ill. Adm. Code 601 specifically authorizing the disposal of low-level radioactive waste away from the point of generation:

License/Amendment Fee: \$25,000 Deposit

Minor Amendment Fee: \$ 360

- B. Low-Level Radioactive Waste Treatment Facilities - licenses specifically authorizing the receipt of low-level radioactive waste material from other persons for treatment away from the point of generation, and transfer to a person authorized to receive or dispose of the material:

License/Amendment Fee: \$25,000 Deposit

Minor Amendment Fee: \$ 360

- C. Centralized Low-Level Radioactive Waste Storage Facilities - licenses specifically authorizing the receipt of low-level radioactive waste material from other persons for storage away from the point of generation, and transfer to a person authorized to receive or dispose of the material:

License/Amendment Fee: \$25,000 Deposit

Minor Amendment Fee: \$ 360

- D. Other Low-Level Radioactive Waste - licenses authorizing other methodologies for disposal of low-level radioactive waste:

License/Amendment Fee: \$10,000 Deposit

Minor Amendment Fee: \$ 360

108

Nuclear Laundries - licenses for commercial collection and laundering of items contaminated with radioactive material:

License Fee: \$ 8,183

109

Decontamination Facilities - licenses that authorize receipt of items contaminated with radioactive material for the purpose of decontaminating such items:

License/Amendment Fee: \$10,000 Deposit

Minor Amendment Fee: \$ 360

(Source: Added at 18 Ill. Reg. 12131, effective August 1, 1994)

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

PART 332
LICENSING REQUIREMENTS FOR SOURCE
MATERIAL MILLING FACILITIES

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332.260	Financial Surety Requirements
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332.290	Maintenance of Records, Reports, and Transfers

AUTHORITY: Implementing and authorized by the Radiation Protection Act of 1990 420 ILCS 40 .

SOURCE: Adopted at 14 Ill. Reg. 1333, effective January 5, 1990; amended at 18 Ill. Reg. 3128, effective February 22, 1994; emergency amendment adopted at 18 Ill. Reg. 17933, effective December 16, 1994, for a maximum of 150 days; amended at 19 Ill. Reg. 6601, effective April 28, 1995.

Section 332.10 Purpose and Scope

- a) The regulations in this Part establish procedures, criteria, and conditions upon which the Department of Nuclear Safety (Department) issues specific licenses for source material milling and disposal of the byproduct material. These procedures are intended to ensure the protection of people and the environment during and after source material milling. The regulations in this Part do not establish procedures and criteria for the issuance of licenses for materials covered under Title I of the Uranium

Mill Tailings Radiation Control Act of 1978 (42 U.S.C. 7901). The regulation by the State of byproduct material as defined in Section 11e(2) of the Atomic Energy Act, as amended, 42 U.S.C. 2014(e), is subject to the provisions of an agreement between the State and the U.S. Nuclear Regulatory Commission (NRC). In the absence of such agreement, the regulations in this Part shall not be enforceable against any source material milling facility.

- b) In addition to the requirements of this Part, unless specified otherwise, all licensees are subject to the requirements of 32 Ill. Adm. Code 310, 320, 330, 331, 340, 341, 400 and 601, and 35 Ill. Adm. Code 302.208, 302.304, 303.202, and 303.203. The regulations in this Part do not apply to disposal of licensed material as provided in 32 Ill. Adm. Code 601.
- c) This Part establishes procedural requirements and technical criteria applicable to any source material milling and to disposal of byproduct material as defined in this Part. It establishes specific technical and financial requirements for source material milling facilities including their construction, operation and decommissioning; decontamination; reclamation and ultimate stabilization; postclosure activities; license transfer and termination; and facility ownership and ultimate custody.

Section 332.20 Definitions

The following definitions are applicable for use in this Part only.

"Act" means the Radiation Protection Act, Ill. Rev. Stat. 1987, ch. 111 1/2, par. 211 et seq.

"Active maintenance" means any activity, other than minor custodial activities, needed to preserve isolation of the byproduct material. Active maintenance includes ongoing activities such as the pumping, removal, or treatment of surface water or groundwater or one-time measures such as replacement of a disposal area cover.

"Aquifer" means a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs. Any saturated zone created by uranium or thorium recovery operations would not be considered an aquifer unless the zone is or potentially is:

hydraulically interconnected to a natural aquifer, capable of discharge to surface water, or reasonably accessible because of migration beyond the vertical projection of the boundary of the land transferred for long-term government ownership and care in accordance with Section 332.280.

AGENCY NOTE: The determination of "significant" will be based on site specific criteria such as yield of the aquifer in volume per unit time, its degree of use or potential for future use for domestic, industrial, or agricultural purposes, the availability of alternative sources, and capability of users to change to alternative sources in the event groundwater protection standards are exceeded.

"Buffer zone" means the area surrounding the site used for disposal of either byproduct material, or material contaminated with uranium or thorium during or as a consequence of source material milling operations. Use of the buffer zone is limited to those activities that would not be detrimental to containment of the wastes, environmental monitoring, interception and processing of any surface or groundwater effluents.

"Byproduct material" means, for purposes of this Part only, the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes. Underground ore bodies depleted by such solution extraction operations do not constitute byproduct material within this definition.

"Closure" means the activities following operations to decontaminate and decommission the buildings and site used to produce byproduct material, to reclaim the tailings area, to reclaim the waste disposal area, and to restore the groundwater to the degree necessary to achieve compliance with the groundwater protection requirements of subsection 332.230(a).

"Closure plan" means the Department approved plan to accomplish closure.

AGENCY NOTE: The Department will approve a closure plan if the plan describes how the licensee will decontaminate, reclaim, and stabilize the licensed site in accordance with the requirements of this Part.

"Commencement of construction" means any clearing of land, excavation, or other substantial action that would adversely affect the natural environment of a site, but does not include changes desirable for the temporary use of land for public recreational uses, necessary borings to determine site characteristics, or other preconstruction monitoring to establish background information related to the suitability of a site or the protection of environmental values.

"Compliance period" begins when the Department sets specific secondary groundwater protection standards in accordance with Section 332.230 and ends when the owner's or operator's license is terminated and the disposal site is transferred to the State or federal agency for long-term care.

"Control boundary" means a physical barrier that separates a restricted area from an unrestricted area.

"Decommissioning" means to remove (as a facility) safely from service and reduce residual radioactivity to a level that permits release of the property for unrestricted use and termination of the license.

AGENCY NOTE: The byproduct material disposal site is not decommissioned because it will neither be released for unrestricted use nor be unlicensed. Land ownership and custody will be maintained by the State or the federal government as required by Section 332.280. However, portions of the licensed site other than the actual byproduct material disposal area are decommissioned.

"Dike" means an embankment or ridge of either natural or man-made materials used to prevent the movement of liquids, sludges, solids, or other materials.

"Disposal area" means the area containing byproduct material to which the requirements of Sections 332.170(c) and 332.240 apply.

AGENCY NOTE: The disposal area includes only the surface area of the land immediately underlain by byproduct material and does not include any embankments, dams, or other supporting structures which surround the byproduct material.

"Disposal site" means the land transferred to the State or federal government under Section 332.280. This land includes the disposal area, any surrounding embankments, or dams that contain the byproduct material.

"Existing portion" means that land surface area of an existing surface impoundment or disposal area on which significant quantities of byproduct material have been placed prior to September 30, 1983.

"Fund" means the "The Radiation Protection Fund", Ill. Rev. Stat. 1987, ch. 111 1/2, par. 218(c).

"Groundwater" means water below and the land surface in a zone of saturation. For purposes of this Part, groundwater is the water contained within an aquifer as defined in this Section.

"Leachate" means any liquid, including any suspended or dissolved components in the liquid, that has percolated through or drained from the byproduct material.

"Licensed site" means the area contained within the boundary of a location under the control of persons generating or storing byproduct material under a Department license.

AGENCY NOTE: The licensed site would include, at a minimum, any actual or proposed disposal areas and sites, any additional land used by the licensee for the generation and storage of byproduct material, and any buffer zones. Normally, this latter land area and any buffer zones will be decommissioned and reclaimed, and not subject to land transfer under Section 332.280.

"Liner" means a continuous layer of natural or man-made material, beneath or on the sides of a surface impoundment which restricts the downward or lateral escape of byproduct material, hazardous constituents, or leachate.

"Long-term care" means the period following postclosure and termination of a license issued under this Part during which surveillance and monitoring activities are conducted by a State or federal Agency.

"Minor custodial activities" means maintenance activities under State specific license, not necessary to preserve the isolation of the byproduct material. Such activities could include repair of fencing, repair or replacement of monitoring equipment, minor additions to or repair of disposal area cover, and general disposal site upkeep such as mowing grass.

"Monitoring" means observing and making measurements to provide data to evaluate the performance and characteristics of a licensed or disposal site.

"Point of compliance" means the site specific location in the uppermost aquifer where the groundwater protection standard must be met.

"Postclosure" means the period of time from completion of the closure plan for decontamination, reclamation, and stabilization of the source material milling facility, byproduct material surface impoundment and disposal area, but prior to the termination of the license.

"Reclamation" means the following activities performed at a licensed site as a part of closure:

stabilize and isolate byproduct material contained within a disposal site. This may include relocation of the byproduct material;
backfill with uncontaminated soil any disturbed areas to achieve a topography compatible with surrounding terrain;
recontour land to support surface drainage; and
revegetate as necessary.

"Restricted area" means any area access to which is controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive material. The restricted area shall not include any areas used for residential quarters, although a separate room or rooms in a residential building may be set apart as a restricted area.

"Source material" means:

uranium or thorium, or any combination thereof, in any physical or chemical form, or
ores which contain by weight one-twentieth of one percent (0.05%) or more of uranium, thorium, or any combination of uranium or thorium. Source material does not include special nuclear material.

"Source material milling" means any operation in which uranium or thorium is extracted and concentrated from ore processed primarily for its source material content. This includes solution mining and heap leaching and any other operation which generates byproduct material as defined in this Part.

"Special nuclear material" means:

plutonium, uranium-233, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the U.S. Nuclear Regulatory Commission determines to be special nuclear material, or
any material artificially enriched by any of the foregoing.

"Surface impoundment" means a natural topographic depression, man-made excavation, or diked area, which is designed to hold an accumulation of liquid wastes containing free liquids, and which is not an injection well.

"Surveillance" means monitoring and observation of the disposal site for the purposes of visual detection of the need for maintenance, custodial care, evidence of unauthorized access, and compliance with other license and regulatory requirements.

"Uppermost aquifer" means the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary.

Section 332.30 License Required

- a) No person shall operate a source material milling facility or byproduct material surface impoundment or disposal area, or receive, possess, dispose, or transfer source or byproduct material associated with such facilities, unless authorized by a license issued by the Department pursuant to this Part and 32 Ill. Adm. Code 330.
- b) Each person shall file an application with the Department pursuant to

before commencement of construction of a source material milling facility, or byproduct material surface impoundment or disposal area.

Failure to comply with this requirement shall be grounds for denial of a license.

- c) Any person who, on the effective date of the Agreement between the State and NRC transferring regulatory authority to the State, possesses a license, issued by the NRC, to operate a source material milling facility or byproduct material surface impoundment or disposal area or to receive, possess, dispose of, or transfer source or byproduct material associated with such facilities, shall be deemed to possess a like license issued under this Part. Such license shall expire 90 days after receipt from the Department of a notice of expiration of such license or on the date of expiration specified in the NRC license, whichever is earlier.

Section 332.40 Application Content and Procedure

- a) In addition to the requirements set forth in 32 Ill. Adm. Code 330.250, an application filed pursuant to this Part shall contain the required information as set forth in Sections 332.50 through 332.90.
- b) The Department will review the application for completeness within sixty (60) days after receipt of the application and will notify the applicant whether or not the application is acceptable for filing. This review of the application shall not constitute the Department's approval of the adequacy of the information and data contained in the application.
- c) The Department may at any time after the filing of the original application, and before the expiration of the license, require further statements or data to enable the Department to determine whether the application should be denied or whether a license should be granted, modified, or revoked.
- d) A license application may include a request for a licensee to engage in one or more activities, provided that the application specifies the additional activities for which licenses are requested and complies with regulations of the Department as to application for such licenses.
- e) In any application, the applicant may incorporate by reference information contained in previous applications, statements, or reports filed by the applicant with the Department. Such reference shall identify the document being referenced by subject, date and page number.
- f) All materials considered to be proprietary in nature shall be separated, marked confidential and sealed in an envelope or package. These materials shall be referenced in the license application.
- g) Ten copies of an application for a specific license, or amendment thereto, shall be filed with the Department.
- h) Each application for a specific license, or amendment thereto, shall be accompanied by the fee prescribed in 32 Ill. Adm. Code 331. Appendix A.

Section 332.50 General Information

The general information shall include each of the following:

- a) Identity of the applicant, including:
 - 1) The full name, address, telephone number, and description of the business or occupation of the applicant;
 - 2) If the applicant is a partnership, the name and address of each partner and the principal location where the partnership does business;
 - 3) If the applicant is a corporation or an unincorporated association, the state where it is incorporated or organized, the principal location where it does business, and the names and addresses of its directors and principal officers; and

- 4) If the applicant is acting as an agent or representative of another person in filing the application, all information required under this subsection shall be supplied with respect to the other person.
- b) Qualifications of the applicant:
 - 1) The organizational structure of the applicant, both offsite and onsite, including a description of lines of authority and assignments of responsibilities, whether in the form of administrative directives, contract provisions, or otherwise;
 - 2) The technical qualifications, including training and experience, of the applicant and members of the applicant's staff to engage in the proposed activities. Minimum training and experience requirements for personnel filling positions described in response to the requirements of subsection (b)(1) shall be provided;
 - 3) A description of the applicant's program for training personnel to execute job functions in a manner consistent with the requirements of this Part and 32 Ill. Adm. Code 310, 320, 330, 340, 341, and 400.
 - 4) The plan to maintain trained personnel to carry out:
 - A) Receipt, possession and transfer of source and byproduct material;
 - B) Source material milling;
 - C) Disposition of byproduct material; and
 - D) Closure of the licensed site, surface impoundments, and disposal areas.
- c) A description of:
 - 1) The location of the proposed source material milling facility, and byproduct material surface impoundments and disposal areas;
 - 2) The general character of the proposed activities;
 - 3) The types and quantities of ores, source material and byproduct material to be received, possessed, stored, transferred, or disposed of;
 - 4) The proposed milling facilities, equipment, surface impoundment and disposal area conceptual design, and size of the licensed site through closure; and
 - 5) The proposed schedules for construction, receipt of ores, the first processing of ores, expansion or increased capacity potential over and above the planned facilities, and the anticipated operational lifetime of the source material milling facility and surface impoundments.

Section 332.60 Technical Information

The application shall contain technical information demonstrating that the technical criteria of this Part will be met. Specifically, the application shall contain:

- a) A description of the characteristics of the proposed licensed site as determined by selection and characterization activities. The description shall include, but need not be limited to, the following:
 - 1) Topography, geology, geochemistry, geotechnology, seismology, hydrology, climatology, meteorology, radioactivity, toxicology, ecology;
 - 2) History, archaeology, and demography;
 - 3) Local economy and land usage;
 - 4) Known natural and mineral resources;
 - 5) Proposed and available modes of transportation; and
 - 6) A list of all endangered plant and animal species on the site and within 10 km.
- b) A description of the design features of the source material milling facility and byproduct material surface

impoundment and disposal area. The description shall include the following:

- 1) Surface and groundwater management;
 - 2) Effluent discharges and monitoring;
 - 3) Licensed site access protection;
 - 4) Occupational exposure control;
 - 5) Licensed site monitoring, closure and maintenance; and
 - 6) Buffer zone adequacy for monitoring and potential mitigative measures.
- c) A description of the design criteria and their relationship to the technical criteria.
 - d) A description of the natural events or phenomena, such as winds and rainstorms, tornadoes, earthquakes and extreme temperatures, used for the design and their relationship to the design criteria.
 - e) A description of codes and standards which the applicant has applied to the design and which will apply to construction of the source material milling facility, and any byproduct material surface impoundment and disposal area.
 - f) A description of the construction and operation of any byproduct material surface impoundment and disposal area. The description shall include as a minimum:
 - 1) Method of construction;
 - 2) Method for emplacement of byproduct material within a surface impoundment or disposal area;
 - 3) Procedures for and areas of waste segregation;
 - 4) Types of access control barriers;
 - 5) Engineering quality control program;
 - 6) Construction quality assurance program;
 - 7) Methods and areas of waste storage;
 - 8) Onsite traffic and drainage systems; and
 - 9) Methods of control surface water and groundwater and precipitation access to the byproduct material.
 - g) A description of methods to be employed in the handling and disposal of the byproduct material including dewatering and neutralizing such materials that, because of physical or chemical properties, might affect meeting the technical criteria of this Part.
 - h) A description of the licensed site closure plan, including those design features which are intended to facilitate closure and to eliminate the need for active maintenance.
 - i) A description of the kind, amount, source, classification and specifications of the radioactive material proposed to be received, possessed, processed, and disposed of at the source material milling facility, any byproduct material surface impoundment, and any disposal area.
 - j) A description of the quality assurance program for the determination of natural characteristics of the licensed site and for the maintenance of quality control during the design, construction, operation, reclamation, decontamination, stabilization, and closure of the licensed site. Audits and managerial controls including criteria and standards shall be incorporated in this program.
 - k) A description of the radiation safety program for controlling and monitoring radioactive effluents to ensure compliance with the technical criteria in Section 332.170; occupational radiation exposure to ensure compliance with the requirements of 32 Ill. Adm. Code 340; and to control contamination of personnel, vehicles, equipment, buildings, and the site. Both routine operations and accidents shall be addressed. The program description shall include procedures, instrumentation, facilities, and equipment.
 - l) A description of the environmental monitoring program designed to provide data to evaluate potential health and environmental impacts and the plan for taking corrective

measures if migration is indicated. Components of an environmental monitoring program generally include:

- 1) the sampling of air, for particulate and gaseous emissions;
 - 2) the sampling of surface water and groundwater;
 - 3) the sampling of soil and sediment;
 - 4) the sampling of vegetation and animals;
 - 5) the sampling of total radon and its daughters;
 - 6) the sampling of direct radiation with both passive integrating devices and survey instruments; and
 - 7) other environmental analysis that might be indicated as a result of site specific conditions.
- m) A description of the proposed methods of decontamination, reclamation, stabilization and postclosure activities within the licensed site.
- n) A description of each emission source and emission control device incorporated into the source material milling operations. The description shall also include the efficiency, calibration procedures and maintenance schedules for emission control devices.
- o) A description of the licensee's procedure for monitoring all pathways of exposure (i.e., ingestion, inhalation, external exposures) to workers and the public. The frequency of monitoring for each pathway shall be site specific and designed to demonstrate compliance with the criteria of Section 332.170.
- p) A description of the administrative procedures that the applicant will apply to control activities at the source material milling facility and any byproduct material surface impoundment, and disposal area including, but not limited to, organization and lines of authority, management audit programs, and internal inspection programs.
- q) An estimate of the environmental effects of accidents on each operation.
- r) A description of regional and site specific characteristics which have seasonal or cyclical variations to include the range of variations in addition to the average values. The site specific preoperational monitoring data must be based on data collected during one year (four consecutive seasons) period or longer. This data shall be collected prior to any alteration of the environment by changes in topography, drainage, or construction of the milling facility and waste disposal system.
- s) A report describing methodology, calibration procedures, quality control and data analysis for each type of measurement shall be included in the application.

Section 332.70 Technical Analyses

The technical information shall also include the following analyses needed to demonstrate that the technical criteria of this Part will be met:

- a) Analysis of radiological impacts, including all pathways of exposure (i.e., ingestion, inhalation, external exposures) of an individual continuously present at the control boundary, the public and those individuals working at the licensed site, in accordance with Section 332.170 and 32 Ill. Adm. Code 340.1010. The analysis of radiological impacts of the proposed project must include the construction, operation, decontamination, reclamation, stabilization and postclosure periods under both normal and low-frequency severe event conditions, e.g. floods, severe storms, earthquakes, tornadoes, extreme temperatures. In addition, the analysis shall include a description of assumptions and procedures used for determination of the source terms, concentrations, and dose-conversion factors. The impact analysis shall also include the following:

- 1) A determination of the radiological impacts to an individual continuously present at the control boundary;
 - 2) A determination of the health impacts to the public, based on existing population and projected population, for 100 years, within a distance of 80 km;
 - 3) A determination of the health impacts to the public, based on existing population and projected population, for 100 years, within a distance to 5 km;
 - 4) Radiological analyses for a period up to 100 years after the anticipated closure;
 - 5) The radiological impacts on groundwater, estimated for a period of 1,000 years after the beginning of the operation; and
 - 6) Identification and differentiation of the roles performed by the natural site characteristics and design features in isolating the byproduct material from environment. The analysis shall include assessments that show the exposures to humans from the release of radioactivity will not exceed the limits set forth in Section 332.170.
- b) Analyses of the protection of individuals during operations shall include assessments for expected exposures due to routine operations and accidents during operation, storage, transfer, transport, and disposal of ores, products, byproducts, and byproduct material as defined in this Part. The analyses shall include assessments that show that exposures will be controlled to meet the requirements of 32 Ill. Adm. Code 340.1010 for individuals in the restricted area, and the requirements of Section 332.170 for individuals outside the control boundary.
- c) Evaluation of the long-term stability of the byproduct material disposal site and the need for active maintenance after closure of the source material milling facility and any byproduct material surface impoundment or disposal area shall be based upon analyses of active natural processes such as erosion, mass wasting, slope failure, settlement of byproduct material and backfill, infiltration through covers over disposal areas and adjacent soils, and surface drainage of the disposal site. The analyses shall include assessments that show that, after closure, the disposal site will not require active maintenance.
- d) Analysis of the protection of the disposal site from inadvertent access shall include demonstration that the site closure requirements of Section 332.180 will be met.

Section 332.80 Institutional Information

Where the proposed disposal site is on land not owned by the federal or State government, the applicant shall submit evidence that arrangements have been made for transfer of ownership in fee to the federal or State government. Such arrangements shall provide that the governmental agency assuming custody of the byproduct material and its disposal site also assume responsibility for long-term care after termination of the license issued by the Department.

Section 332.90 Financial Information

The financial information shall be sufficient to determine that the financial qualifications of the applicant are adequate to comply with financial surety regulations set forth at Section 332.260.

Section 332.100 Evaluation of License Application and Issuance of a License

a) Environmental Analysis

- 1) Each application for a license or license amendment must be reviewed and the license or amendment must be issued by the Department before commencement of any major construction activity. As part of its review of such applications, the Department shall prepare a written analysis of the impact of the license including any activities conducted pursuant thereto. The analysis shall include the following:
 - A) An assessment of the radiological and nonradiological impacts to the public health from the activities to be conducted pursuant to the license or amendment;
 - B) An assessment of any impact on any waterway and groundwater resulting from the activities conducted pursuant to the license or amendment;
 - C) Consideration of alternatives, including alternative sites and engineering methods, to the activities to be conducted pursuant to the license or amendment; and
 - D) Consideration of the long-term impacts including decommissioning, decontamination and reclamation impacts, associated with activities to be conducted pursuant to the license or amendment.
- 2) Commencement of construction prior to issuance of the license or amendment shall be grounds for denial of the license or amendment; and
- 3) The environmental analysis prepared in accordance with subsection (a)(1) shall be available to the public before the commencement of hearings regarding the merits of the application.

b) Public participation

1) Written comments

- A) Upon completing preparation of the analysis pursuant to subsection (a), the Department shall publish a notice of the availability of the environmental analysis in the official State newspaper and in a newspaper published in the county or counties where the facility which is the subject of licensing action is to be located. This notice shall specify how a copy of the environmental analysis can be obtained as well as the deadline and address for submitting written comments on the license application.
- B) The Department shall accept written comments on the license application and the environmental analysis for at least 45 days following the publication of the notice described in subsection (b)(1)(A).

2) Hearings

- A) At least 30 days prior to the issuance or renewal of a license pursuant to this Part, the Department shall publish a Notice of Opportunity to request a hearing in the official State newspaper and in a newspaper published in the county or counties where the facility that is the subject of the license application is located. This notice shall contain:
 - i) a statement identifying the location of the facility,

- ii) a statement of the availability of the environmental analysis,
- iii) a statement of the right to request a hearing,
- iv) the date by which a request for a hearing is to be submitted to the Department, such date shall be no less than 20 days from the date of the publication of the notice, and
- v) a statement of the actions that will be taken by the Department in the event that a hearing is not requested.

- B) Any person who would be adversely affected by the issuance of the license may request a hearing. The request must be in writing and must contain a brief statement of the basis upon which the issuance of the license is being challenged. If the request is not submitted by the date specified in accordance with subsection (b)(2)(A), or if the request is submitted but later withdrawn, the Department shall issue the license in accordance with subsection (c).

- C) If any hearing is requested in accordance with subsection (b)(2)(B), the parties to the hearing shall be the Department and the Respondent. The provisions of 32 Ill. Adm. Code 200.20, 200.40, 200.50, 200.80 through 200.140 and 200.160 through 200.230 shall be applicable to the hearing.

- c) Upon a determination that an application meets all criteria of this Part, the Department shall issue a specific license authorizing the construction of the source material milling facility and any byproduct material surface impoundment and disposal area. Upon completion of the construction in accordance with the license specifications, the Department shall authorize operations at the licensed site after verification of compliance with the license specifications.

- d) The Department may incorporate in any license at the time of issuance, or thereafter by appropriate rule or order, additional requirements and conditions in order to:

- 1) Ensure compliance with the requirements of this Part;
- 2) Reduce potential hazard to public safety during operation;
- 3) Protect the environment; or
- 4) Prevent loss or theft of materials subject to this Part.

- e) The Department may require reports, examine records and inspect activities under the license as necessary to demonstrate compliance with the requirements of this Part.

- f) Throughout the construction and operating phases of the source material milling facility, a monitoring program shall be conducted by the licensee in order to:

- 1) Demonstrate compliance with the standards of this Part and 32 Ill. Adm. Code 310, 340, and 400;
- 2) Evaluate the performance of control systems and procedures;
- 3) Evaluate environmental impacts of operation; and
- 4) Detect potential long-term adverse effects.

- g) The source material milling facility shall be designed and operated so that effluents and emissions are less than the exposure and concentration limits specified in 32 Ill. Adm. Code 340.Appendix A and in Section 332.170. The licensee shall limit emissions and exposures by using emission control devices. If the licensee cannot meet the requirements using emission control devices, then institutional controls, such as extended licensed site boundaries and buffer zones, may be used to ensure that limits of exposure and concentrations at the boundary of

the restricted area will be met. The licensee shall submit to the Department proposed operation procedures and shutdown procedures as evidence that the requirements specified in 32 Ill. Adm. Code 340 will be met.

Section 332.110 General Conditions of Licenses

- a) The licensee shall be subject to the provisions of the Act and to all rules, regulations, and orders of the Department. The terms and conditions of the license are subject to amendment, revision, or modification, by reason of amendments to, or by reason of regulations and orders issued in accordance with the terms of the Act.
- b) Each person licensed by the Department pursuant to the regulations of this Part shall confine possession and use of materials to the locations and purposes authorized in the license.
- c) The licensee shall not process any ore or place any byproduct material in any surface impoundment or disposal area until the Department has inspected it and, based on the results of the inspection, has determined that it conforms to the description, design, and construction described in the application for the license.
- d) No license issued under this Part, or any right thereunder, may be transferred, assigned, or in any manner disposed of, either voluntarily or involuntarily, directly or indirectly, through transfer of control of the license to any person, unless the Department finds, after securing information, that the transfer is in accordance with the provisions of the Act and gives its consent in writing in the form of a license amendment.
- e) The authority to receive and process ores and to place byproduct material within any surface impoundment and disposal area expires on the date stated in the license. Any expiration date on a license applies only to the receipt and processing of ores and the emplacement of byproduct material. Failure to renew the license shall not relieve the licensee of responsibility for implementing reclamation, decontamination, stabilization and closure, postclosure observation and maintenance, and transfer of the license to the ultimate governmental owner.
- f) The license will terminate only on the full implementation of the final closure plan as approved by the Department, including postclosure observation and maintenance, and meeting the requirements of Section 332.140.
- g) Notification of Bankruptcy:
 - 1) The licensee shall notify the Department, in writing, immediately following the filing of a voluntary or involuntary petition for bankruptcy under any Chapter of 11 U.S.C. 101 et seq. (Bankruptcy) of the United States Code by or against;
 - A) The licensee;
 - B) An entity (as that term is defined in 11 U.S.C. 101(14)) controlling the licensee or listing the license or licensee as property of the estate; or
 - C) An affiliate (as that term is defined in 11 U.S.C. 101(2)) of the licensee.
 - 2) This notification must indicate:
 - A) The bankruptcy court in which the petition for bankruptcy was filed; and
 - B) the date of the filing of the petition.
- h) The licensee shall submit written statements, as requested by the Department at any time before termination of the license, to enable the Department to determine whether the license should be modified, suspended, or revoked.
 - a) At least 1 year prior to license expiration, the licensee shall notify the Department of its intent to either renew its license or to seek an amendment authorizing closure. At least 30 days prior to license expiration, the licensee shall file with the Department either an application for renewal of the license or an application for a license amendment authorizing closure.
 - b) Applications for renewal of a license shall be filed in accordance with Sections 332.40 through 332.90. All applications for closure shall be filed in accordance with Sections 332.130. Information contained in previous applications, statements, or reports filed with the Department under the license may be incorporated by reference.
 - c) In any case in which a licensee has filed an application in proper form for renewal of a license, the license does not expire until the Department has taken final action on the application for renewal.
 - d) In determining whether a license will be renewed, the Department will apply the criteria set forth in Section 332.100.
 - e) Upon evaluation of an application to amend the license for closure submitted in accordance with Section 332.130, the Department shall issue an amendment to the license authorizing closure if the assessment of the application demonstrates that the technical criteria of Sections 332.200 through 332.240 will be met.

Section 332.130 Contents of Application for Site Closure and Stabilization

Prior to beginning final closure of the licensed site, or as otherwise directed by the Department, the licensee shall submit an application to amend the license for closure. The application for amendment shall include an updated closure plan and shall provide the following specific information regarding site closure.

AGENCY NOTE: Other circumstances which would cause the Department to direct the licensee to submit an application for closure include, but are not limited to, failure to meet the technical criteria of this Part, failure to post and maintain adequate financial surety, or failure to meet the requirements of the Act.

- a) Any additional geologic, hydrologic, or other data pertinent to the long-term containment of the emplaced byproduct material generated during the operational period.
- b) The results of tests, experiments, or any other analyses relating to any surface impoundment and disposal area, closure, waste migration, and interaction with byproduct material or any other tests, experiments, or analyses pertinent to the long-term containment of the emplaced byproduct material within the disposal site.
- c) Any proposed revision of plans for:
 - 1) Decontamination and/or dismantlement of mill and surface impoundments;
 - 2) Recontouring or backfilling of areas; or
 - 3) Stabilization of the disposal area for postclosure care.
- d) Any information, not previously submitted to the Department, regarding the potential environmental impact of closure activities and long-term performance of the disposal site.

Section 332.140 Postclosure Observation and Maintenance

- a) The licensee shall observe, monitor, and maintain the licensed site until closure is complete and the license is terminated under the authorization of the Department in accordance with Section 332.150. The licensee shall be responsible for disposal site maintenance for 15 years after

Section 332.120 Application for Renewal or Closure

completion of closure. A longer time period for postclosure observation and maintenance will be required if the Department determines that the licensee has not designed and closed the disposal site in accordance with the closure plan specified in the license.

- b) During the postclosure period, the licensee shall conduct four disposal site inspections each year, once each season. Additional inspections shall be performed after each earthquake, which at the disposal site exceeds a level 6 on the Modified Mercalli Index, or flood, or abnormal change in climate, such as precipitation in excess of 10 times the seasonal average level. The results of the inspections, the monitoring data and the evaluation of the monitoring data shall be reported to the Department within 60 days after each inspection. The Department shall require more frequent disposal site inspections, if necessary to establish compliance with the requirements of Section 332.100, or if there has been unauthorized use of the disposal site.

Section 332.150 Termination of Source Material Milling Facility License

- a) Following closure and the period of postclosure observation and maintenance, the licensee may apply for termination of the license. The license shall be terminated when the Department finds:
- 1) That the closure of the licensed site has been made in conformance with the licensee's closure plan, as amended and approved as part of the license;
 - 2) That the licensee has established that the technical criteria of this Part have been met;
 - 3) That any long-term care funds and records are transferred to the federal or State agency that will assume institutional control of the disposal site;
 - 4) That the federal or State agency that will assume responsibility for long-term care, observation, and maintenance of the disposal site is prepared to assume such responsibilities;
 - 5) That permanent monuments or markers warning against intrusion have been installed;
 - 6) That the U.S. Nuclear Regulatory Commission has made a determination of compliance with the decontamination, decommissioning, reclamation, and stabilization standards; and
 - 7) That title to the byproduct material and to the disposal site has been transferred to the United States of America or the State.
- b) In addition to satisfying requirements in subsection (a) above, the licensed site, other than the buildings and disposal area, shall be decontaminated to the following limits prior to termination of the license:
- 1) Concentration of radionuclides in soil above background concentrations for total radium, averaged over areas of 100 square meters, shall not exceed:
 - A) 5 picocuries per gram of dry soil, averaged over the first 15 centimeters below the surface; and
 - B) 15 picocuries per gram of dry soil, averaged over layers of 15 centimeters thickness more than 15 centimeters below the surface.
 - 2) The level of gamma radiation measured at a distance of 100 centimeters from the surface shall not exceed background.
 - 3) Soil contamination levels with non-radioactive hazardous substances shall be less than the levels specified as contamination limits in other applicable State or federal regulations.

Section 332.160 General Requirements

Source material milling facilities, and byproduct material surface impoundments and disposal areas shall be sited, designed, operated, closed, and controlled after closure so that exposures to individuals will be within the requirements established in the technical criteria in Sections 332.170, 332.180, 332.190 and 332.240.

Section 332.170 Protection of the General Population from Radiation

- a) At all times, concentrations of radioactive material, excluding radon, thoron and their progeny, which may be released to the general environment in groundwater, surface water, air, soil or other means:
- 1) Shall not result in an annual effective dose equivalent in excess of 25 millirem (0.25 mSv) to the whole body of any member of the public; and
 - 2) Shall not result in an annual dose equivalent in excess of 75 millirem (0.75 mSv) to the thyroid or 25 millirem (0.25 mSv) to any other organ of any member of the public.
- b) Releases of radionuclides in effluents to the general environment shall be maintained as low as is reasonably achievable.
- c) During the operating life and facility decommissioning, the combined concentration of radon and thoron at the boundary of the licensed site, measured at a height of one meter from the surface, averaged annually, shall not exceed three picocuries per liter above the background concentration at the licensed site.
- d) The disposal area shall be designed so that after reclamation and stabilization, the annual total radon release rate through the cover from the byproduct material shall not exceed two picocuries per square meter per second. Furthermore, the direct gamma exposure rate from the byproduct material shall be reduced to background levels normal for areas in the vicinity.

(Source: Amended at 18 Ill. Reg. 3128, effective February 22, 1994)

Section 332.180 Protection of Individuals from Inadvertent Access

Design, operation, and closure of the facility disposal area shall protect any individual inadvertently entering onto the disposal site at any time after termination of the license by the Department.

Section 332.190 Protection of Individuals During Operations

Operations at a licensed site shall be conducted in compliance with the standards for radiation protection established in 32 Ill. Adm. Code 340, except that releases of radionuclides in effluents from the licensed site shall be governed by Section 332.170. Every effort shall be made to maintain radiation exposures as low as is reasonably achievable.

Section 332.200 Stability of the Byproduct Material Disposal Site After Closure

The disposal site shall be sited, designed, used, operated, stabilized and closed to achieve long-term stability and to eliminate the need for active maintenance following closure so that only surveillance, monitoring, or minor custodial care is required.

Section 332.210 Technical Criteria for Byproduct Material Disposal Sites - Siting Criteria

- a) Byproduct material shall be disposed of in a manner that provides containment of the material by preventing

disturbances and dispersion by natural forces, and by doing so without active maintenance. In evaluating a byproduct material disposal site, the Department shall consider:

- 1) Remoteness from populated areas;
 - 2) Hydrologic and other natural conditions as they contribute to continued immobilization and isolation of contaminants from groundwater sources; and
 - 3) Potential for minimizing erosion, disturbances, and dispersion by natural forces over the long term.
- b) The disposal site selection shall be an optimization, to the maximum extent achievable, of the features listed in subsection (a). At a minimum, however:
- 1) The disposal site shall not be within a distance of 2.5 km (1.5 miles) from the boundary of any municipality without the consent of the governing body of the municipality. The disposal area must incorporate a distance between any waste disposal unit and the control boundary which is of adequate dimensions to carry out required environmental monitoring activities and remediation activities if necessary. In most cases, a distance of 100 meters would be adequate;
 - 2) The tailings and waste disposal site shall not be located in a 100-year flood plain, as defined in the rules of the Illinois Department of Transportation, 92 Ill. Adm. Code 706.Subpart C;
 - 3) The characteristics of the disposal site shall allow prediction, analysis and monitoring of any migration of effluents, e.g., the site geology must be simple enough to allow reliable hydrological modeling;
 - 4) The depth to the water table at the disposal site shall not permit groundwater intrusion, perennial or otherwise, into the waste;
 - 5) The natural characteristics of the disposal site such as hydrology, geology, and topography shall contribute to continued immobilization and containment, and shall ensure that waste will be contained within the disposal site boundary for a period of at least 1,000 years after the decommissioning;
 - 6) The disposal site shall not be located where other facilities, activities or land uses could adversely impact the ability of the site to meet the technical criteria of this Part, or mask the environmental impacts of the disposal area;
 - 7) The disposal area structure shall not be located above a geologic fault system. The disposal site geology must be stable, i.e., mass wasting, erosion, slumping, or land sliding shall not adversely affect the long-term containment; and
 - 8) The disposal area shall not be located near a capable fault that could cause a maximum credible earthquake larger than that which the disposal area could reasonably be expected to withstand. As used in this Part, the term "capable fault" has the same meaning as defined in Section III(g) of 10 CFR 100, Appendix A, in effect on January 1, 1989, exclusive of subsequent amendments or editions. The term "maximum credible earthquake" means that earthquake which would cause the maximum vibratory ground motion based upon an evaluation of earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material.
- c) When evaluating disposal sites, the Department shall place emphasis on containment of byproduct material, a matter

having long-term impacts, as opposed to consideration only of short-term convenience, impacts or benefits. While containment of byproduct material will be a function of both site and engineering design, major consideration shall be given to siting features that pertain to the long-term nature of the hazards.

- d) To avoid the proliferation of small byproduct material disposal sites and reduce perpetual surveillance obligations, byproduct material from in situ extraction operations, such as residues from solution evaporation or contaminated control processes, and wastes from small remote aboveground extraction operations shall be disposed of at existing large byproduct material disposal sites; unless, considering the nature of the wastes, such as their volume and specific activity, and the cost and environmental impacts of transporting the wastes to large disposal sites, such offsite disposal is demonstrated to be impracticable or the advantages of onsite burial clearly outweigh the benefits of reducing the perpetual surveillance obligations.

Section 332.220 Technical Criteria for Byproduct Material Disposal Sites - Design Criteria

- a) When submitting a proposed method of disposal for evaluation by the Department, the licensee shall either:
- 1) Submit to the Department a plan describing how the licensee will dispose of byproduct material and contaminants below grade; or
AGENCY NOTE: The Department presumes that disposal of tailings by placement below grade, either in mines or in excavated pits, is the method of disposal which best furthers the objective of containment of byproduct material and contaminants without requiring active maintenance. However, below grade disposal is not the most environmentally sound approach if a groundwater formation is relatively close to the surface or not very well isolated by overlying soils and rock. Geologic and topographic conditions might make full below grade disposal impracticable.
 - 2) Submit to the Department data which support the licensee's conclusion that disposal below grade is not the most environmentally sound approach, as well as a description of the licensee's alternative method for tailings disposal. The alternative method shall provide for excavation to the greatest degree achievable, given the geologic and hydrologic conditions at the site, so that the size of retention structures, and the steepness of slopes of associated exposed embankments shall be minimized. The licensee shall also demonstrate that its proposed above grade disposal program will provide containment of the byproduct material equivalent or superior to that which would be achieved from below grade disposal.
- b) Disposal site surfaces
- 1) Embankment and cover slopes shall be relatively flat after final stabilization to minimize the potential for erosion and to provide conservative factors of safety assuring long-term stability. Final slopes shall be contoured to grades that are as close as possible to those which would be provided if byproduct material were disposed of below grade. Slopes shall not be steeper than 10 horizontal to 1 vertical.
 - 2) All disposal site surfaces shall be contoured to avoid areas of concentrated surface runoff or abrupt or sharp changes in slope. In addition to rock cover

on slopes, areas toward which surface runoff might be directed shall be well protected with rock cover or rip rap. Overall stability, erosion potential, and geomorphology of surrounding terrain must be evaluated to assure that there are not ongoing or potential processes, such as gully erosion, that would lead to disposal area instability.

- c) The disposal site and area, where feasible, shall be designed to incorporate features which will promote deposition. For example, design features which promote deposition of sediment suspended in any runoff which flows into the disposal area might be utilized; the object of such a design feature would be to enhance the thickness of cover over time.
- d) The disposal site shall be designed so that the upstream rainfall catchment does not increase surface erosion or flooding of the disposal site.
- e) A full self-sustaining vegetative cover shall be established or rock cover employed to control wind and water erosion. However, rock covering of slopes is unnecessary where:
 - 1) top covers are very thick (on the order of 10m or greater);
 - 2) impoundment slopes are very gentle (on the order of 10 horizontal: 1 vertical or less);
 - 3) bulk cover materials have inherently favorable erosion resistance characteristics;
 - 4) there is negligible drainage catchment area upstream of the disposal site; and
 - 5) the topographic features of the disposal site provide wind protection.
- f) Where rock cover is employed, in order to avoid displacement of rock particles by human and animal traffic, root invasion, or by natural process, and to preclude undercutting and piping, the following factors shall be accounted for in the rock cover design:
 - 1) Shape, size, composition, and gradation of rock particles. Except for bedding material average particle size shall be at least cobble size or greater;
 - 2) Rock cover thickness and zoning of particles by size;
 - 3) Steepness of underlying slopes; and
 - 4) Individual rock fragments shall be dense, sound, and resistant to abrasion, and shall be free from cracks, seams, and other defects that would tend to unduly increase their destruction by water and frost actions. Weak, friable, or laminated aggregate shall not be used.

Section 332.230 Technical Criteria for Byproduct Material Licensed Sites - Groundwater Protection

- a) In order to provide adequate protection of groundwater resources, the licensed site shall be designed, constructed, maintained and operated to conform with the requirements of criterion 5 of 10 CFR 40, Appendix A, in effect on January 1, 1994, exclusive of subsequent amendments or editions. In addition, closure shall be performed to conform with the requirements of criterion 5 of 10 CFR 40, Appendix A, in effect on January 1, 1994, exclusive of subsequent amendments or editions. Criterion 13 of 10 CFR 40, Appendix A, in effect on January 1, 1994, identifies the constituents for which standards shall be set or complied with if the specific constituent is expected to be in or derived from the byproduct material and has been detected in groundwater.
- b) The licensee shall establish a detection monitoring program needed for the Department to set the site-specific groundwater protection standards in subsection (a) above. The licensee or applicant shall propose for Department

approval as license conditions which constituents are to be monitored on a site-specific basis. A detection monitoring program shall be designed and implemented to accomplish two purposes. The program shall be designed and implemented to detect leakage of the hazardous constituents from the licensed site so that the need to set groundwater protection standards is monitored. If leakage is detected, the program shall be designed and implemented to generate data and information needed for the Department to establish the standards under subsection (a) above. The data and information shall provide a sufficient basis to identify those hazardous constituents which require concentration limit standards and to enable the Department to set the limits for those constituents and the compliance period. The data and information shall also provide the basis for adjustments to the point of compliance, if necessary.

- c) Once groundwater protection standards have been established pursuant to subsection (a) above, the licensee shall establish and implement a compliance monitoring program. The purpose of the compliance monitoring program is to determine that the hazardous constituent concentrations in groundwater continue to comply with the standards set by the Department. In conjunction with a corrective action program, the licensee shall establish and implement a corrective action monitoring program. The purpose of the corrective action monitoring program is to demonstrate the effectiveness of the corrective actions. Any monitoring program required by this subsection (c) may be based on existing monitoring programs to the extent the existing programs can meet the stated objective for the program.

(Source: Amended at 19 Ill. Reg. 6601, effective April 28, 1995)

Section 332.240 Technical Criteria for Byproduct Material Disposal Sites - Control of Radiation Hazards

- a) Licensees shall place an earthen cover over byproduct material at the end of source material milling operations and shall close the disposal site in accordance with a design which assures compliance with the requirements specified in Section 332.170(c) for a period of 1,000 years. Lands not decommissioned in accordance with Section 332.150(b)(1) shall be incorporated into the disposal area. Monitoring for total radon after installation of an appropriately designed cover is not required. Total radon emissions from cover material shall be estimated as part of developing a closure plan. The standard for total radon release rate specified in Section 332.170(c), however, applies only to emissions from byproduct material. In computing required byproduct material area cover thicknesses, average moisture in the cover shall be determined from similar soils and under similar circumstances. The effects of any synthetic layer shall not be taken into account in determining the calculated total radon release rate. If material other than soil is proposed as cover material, it shall be demonstrated that such material will not crack or degrade by differential settlement, weathering, or other mechanism, over long-term time intervals. Near surface cover material within the top three meters shall not include byproduct material or rock that contains elevated levels of radium; soils used for near surface cover shall be essentially the same, as far as radioactivity is concerned, as that of surrounding surface soils.
- b) The licensee shall ensure that disposal sites are closed in a manner that assures no active maintenance will be

required. The licensee shall address the nonradiological hazards associated with the wastes in planning and implementing closure. To the extent necessary to prevent threats to human health and the environment, the licensee shall control or eliminate postclosure escape of nonradiological hazardous constituents, leachate, contaminated rainwater, or waste decomposition products to groundwater, surface water or to the atmosphere.

Section 332.250 Technical Criteria - Source Material Milling Operations

- a) Liquids resulting from any of the mill processes shall not be released into surface streams. In addition, contaminated solutions, other than liquids resulting from any of the mill processes, shall not be released into the environment if the solutions have radionuclide concentrations in excess of those specified in 32 Ill. Adm. Code 340.Appendix A (see Table II, Column 2).
- b) Byproduct material shall be chemically and physically treated to immobilize or remove the contaminants.
- c) An independent quality assurance program shall be established to assure that specifications of the monitoring program detailed in the license are met. If adverse groundwater impacts or conditions conducive to adverse groundwater impacts occur, action shall be taken to alleviate the impacts or conditions and restore groundwater quality to levels consistent with those before operations began.
- d) Source material milling operations shall be conducted so that all airborne effluent releases are reduced to levels as low as is reasonably achievable. Emissions controls shall be used. Institutional controls, such as extending the licensed site boundary and exclusion area, may be employed to ensure that offsite exposure limits are met, but only after all practicable measures have been taken to control emissions at the source. Notwithstanding the existence of individual dose standards, strict control of emissions is necessary to assure that population exposures are reduced to the maximum extent reasonably achievable and to avoid site contamination. During operations and prior to closure, radiation doses from radon emissions from surface impoundments and disposal areas containing byproduct material shall be kept as low as is reasonably achievable. Checks shall be made and logged hourly of all parameters which determine the efficiency of product stack emission control equipment operation. It shall be determined whether or not conditions are within a range prescribed to ensure that the equipment is operating consistently near peak efficiency. Corrective action must be taken when performance is outside of prescribed ranges. Effluent control devices must be operative at all times during drying and packaging operations and whenever air is exhausting from the product stack. Drying and packaging operations shall terminate when controls are inoperative. When checks indicate the equipment is not operating within the range prescribed for peak efficiency, actions shall be taken to restore parameters to the prescribed range. When this cannot be done without shutdown and repairs, drying and packaging operations shall cease as soon as practicable. Operations shall not be restarted after cessation due to abnormal performance until needed corrective actions have been identified and implemented. All such cessations, corrective actions, and restarts shall be reported to the Department, in writing, within ten (10) days of the subsequent restart.
- e) To control fugitive dust from tailings, all surfaces not covered by standing liquids shall be wetted or chemically stabilized. For licenses initially granted after the effective

date of this Part, management of tailings shall incorporate phased-in surface stabilization and reclamation. To control dusting from diffuse sources, operators shall develop written operating procedures specifying the methods of control which will be used.

- f) Byproduct material shall be managed so as to conform to the applicable provisions of 40 CFR 440, Ore Mining and Dressing Point Source Category: Effluent Limitations Guidelines and New Source Performance Standards, Subpart C, Uranium, Radium, and Vanadium Ores Subcategory, in effect on January 1, 1983, exclusive of subsequent amendments or editions.
- g) Licensees and applicants shall satisfy the requirements of 40 CFR 61, in effect on July 1, 1989, exclusive of subsequent amendments or editions.
- h) Inspection of the byproduct material impoundments and disposal areas:
 - 1) The licensee shall conduct daily inspections of any surface impoundment and disposal site and document the results of the inspections. Records of the inspections shall be maintained for review by the Department for 5 years.
 - 2) The licensee shall notify the Department within 2 hours by telephone and then within 48 hours by written report of any failure of a byproduct material surface impoundment or disposal area which results in a release of byproduct material into unrestricted areas. The licensee shall notify the Department, in writing, within 5 working days of any condition which was not anticipated in the design of the byproduct material surface impoundment or disposal area and, if not corrected, could cause failure of embankments or other structures containing the byproduct material and the release of byproduct material into unrestricted areas.
 - 3) In cases of failure of the byproduct material impoundment, the report shall be maintained for transfer to the governmental agency to which the title of the facility will be transferred.

Section 332.260 Financial Surety Requirements

- a) The license applicant shall establish financial surety arrangements, prior to the Department authorization of commencement of operations, to assure the availability of sufficient funds for decontaminating, decommissioning and reclaiming the source material milling facility and licensed site as well as the stabilization and closure of the byproduct material disposal site and the long-term care payment.
- b) An acceptable surety arrangement may consist of cash or negotiable securities deposited with the Department, irrevocable assignments of savings or certificates of deposit, or the deposit of an instrument executed by the applicant or licensee and a corporate surety or financial institution with the Department designated as the beneficiary. However, self insurance, or any arrangement which essentially constitutes self insurance (e.g., a contract with a State or federal agency) will not satisfy the surety requirement since this provides no additional assurance other than that which already exists through license requirements. The value of the deposit shall be equal to or greater than the amount of the surety required by subsection (c). Any surety arrangement must be available in Illinois subject to judicial process and execution in the event required for the purposes set forth in this Part.
- c) The amount of funds to be ensured by such surety arrangements shall be greater than or equal to the Department approved cost estimates for:

- 1) decontamination, decommissioning, restoration, and reclamation of buildings and the licensed site;
 - 2) stabilization and closure of the disposal area; and
 - 3) the requirements of Section 332.270 for the long-term care payment.
- d) In establishing specific surety arrangements, the applicant's or licensee's cost estimates shall take into account the total costs that would be incurred if an independent contractor were hired to perform the work identified in subsections (c)(1) and (2).
- e) To avoid duplication and expense, the Department will accept surety arrangements that have been consolidated with surety arrangements established to meet requirements of other agencies in Illinois for decontamination, reclamation, restoration, and disposal, if the applicant demonstrates, in writing, that such surety provides the same or a greater degree of protection for the licensed site, provided that such arrangements are adequate to satisfy these requirements and that the portion of the surety which covers the decommissioning, decontamination, reclamation, and stabilization of the site, and the long-term care payment is specifically identified and committed for use in accomplishing these activities.
- f) The applicant's or licensee's surety arrangements will be reviewed annually by the Department to assure that sufficient funds will be available for completion of the closure plan if the work was to be performed by an independent contractor. The amount of surety shall be adjusted to recognize any increases or decreases resulting from inflation, changes in engineering plans, activities performed, and any other conditions affecting costs. Regardless of whether closure is phased through the life of the operation or takes place at the end of operations, a portion of the surety shall be retained until final compliance with the closure plan is determined by the Department.
- g) The term of the surety mechanism shall be open-ended, unless the licensee proposes another arrangement which provides an equivalent or greater level of assurance. The surety instrument shall provide that the surety mechanism will not be cancelled unless the surety notifies both the Department and the licensee at least 90 days prior to cancellation. Proof of forfeiture shall not be necessary to collect the surety so that in the event that the licensee could not provide an acceptable replacement surety within the required time, the surety shall be automatically collected prior to its expiration or cancellation.

Section 332.270 Long-Term Care Fund

- a) Prior to termination of a source material milling or byproduct material license, a minimum payment of \$250,000 (1978 dollars) to cover the cost of long-term care shall be paid by the licensee. If title and custody to land and byproduct material are transferred to the State, the payment shall be made to the State agency assuming custody. If title and custody are transferred to a federal agency, the payment shall be deposited in the general treasury of the United States.
- b) If the cost of long-term care is determined on the basis of a site specific evaluation, to be greater than \$250,000 (1978 dollars), variance in the funding requirements shall be specified by the Department. The total amount of the payment must be such that with an assumed 1 percent annual real interest rate, the collected funds will yield interest in an amount sufficient to cover the annual costs of long-term care. The minimum funding requirement will be adjusted annually prior to actual payment to recognize inflation. The inflation rate to be used is that indicated by

the change in the Consumer Price Index published by the U.S. Department of Labor, Bureau of Labor Statistics.

Section 332.280 Land Ownership

- a) These requirements relating to ownership of byproduct material, mineral rights and disposal sites apply to all licenses terminated, issued, or renewed after the effective date of this Part.
- b) Unless exempted by NRC, title to land (including any affected interests therein) which is used for the disposal of byproduct material, or is essential to ensure the long-term stability of the disposal area and the title to byproduct material shall be transferred to the United States of America or the State of Illinois, at the State's option, prior to the termination of the license. The applicant or licensee shall attempt to obtain ownership of severable subsurface interests and rights, and shall, in the event that certain rights cannot be obtained, provide notification in local public land records of the fact that the land is being used for the disposal of radioactive material and is subject to an NRC license prohibiting disruption and disturbance of the radioactive material.
- c) The use of the surface or subsurface estates, or both, of the lands transferred to the State or to the United States of America is prohibited unless the NRC determines by order that such use will not endanger the public health, safety, welfare, or environment. The person who transferred such lands to the State or to the United States of America shall have the right of first refusal with respect to such use of such lands.
- d) Byproduct material and land transferred to the United States of America or the State in accordance with this section shall be transferred without cost to the United States of America or the State other than administrative and legal costs incurred in carrying out such transfer.
- e) The provisions of this Section respecting transfer of title and custody to land and byproduct material do not apply in the case of lands held in trust by the United States of America for any Indian tribe or lands owned by such Indian tribe subject to a restriction against alienation imposed by the United States of America. Where such lands are used for the disposal of byproduct material, the licensee shall enter into arrangements with the NRC as may be appropriate to assure the long-term care and maintenance of such lands by the United States of America.
- f) Prior to termination of the license, the licensee shall provide evidence that it will comply with ownership requirements of this Section.

Section 332.290 Maintenance of Records, Reports, and Transfers

- a) Each licensee shall maintain any records and make any reports in connection with the license activities as may be required by the conditions of the license or by the rules, regulations, and orders of the Department.
- b) Records which are required to be maintained by regulation or by license conditions shall be maintained for a time period specified in the applicable regulation or license condition. If a record retention period is not otherwise specified, these records shall be maintained and transferred to the officials specified in subsection (d) below as a condition of license termination unless the Department otherwise authorizes their disposition.
- c) Records which shall be maintained pursuant to this Part may be the original, or a reproduced copy or microfilm if this reproduced copy or microfilm is capable of producing

copy that is clear and legible at the end of the required retention period.

- d) Copies of records of the location and quantity of byproduct material contained in the disposal site shall be transferred upon license termination to the Department, the agency responsible for long-term care, the U.S. Nuclear Regulatory Commission, the chief executive of the nearest municipality, the chief executive of the county in which the disposal site is located, the county zoning board or land development and planning agency, and the Governor.
- e) Each licensee shall file a copy of its financial report or a certified financial statement annually with the Department in order to update the information base for determining the continued financial qualifications of the licensee.
- f) Each licensee shall submit status reports to the Department. The reports shall be submitted within 60 days after January 1 and July 1 of each year and shall cover the previous 6 months of operation. The reports shall include:
 - 1) Specification of the quantity of each of the radionuclides released to unrestricted areas in liquid and gaseous effluents;
 - 2) The results of the environmental monitoring program;
 - 3) The data shall be reported in a manner that will permit the Department to confirm the potential annual radiation doses to the public;
 - 4) A summary of licensee survey and maintenance activities;
 - 5) A summary of activities and quantities of licensed material processed, stored, transferred, or disposed of; and
 - 6) Any instances in which observed site, facility, process, or equipment characteristics were significantly different from those described in the application for a license; and
 - 7) If the quantities of radionuclides released are more than 25% greater than those anticipated in the license application, or if unanticipated maintenance is performed, a discussion of the cause of the release or the reason for the maintenance.

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

PART 333
FEES FOR CALIBRATION SERVICES

Section	
333.10	Purpose and Scope
333.20	Procedure for Requesting Calibration Services
333.30	Conditions
333.40	Calibration Services
333.50	Fee Schedule
333.60	Other Provisions

AUTHORITY: Implementing and authorized by Section 25(g) of the Radiation Protection Act of 1990 (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 210-25(g)) 420 ILCS 40/25(g).

SOURCE: Adopted at 18 Ill. Reg. 2615, effective February 7, 1994.

Section 333.10 Purpose and Scope

Under the provisions of the Radiation Protection Act of 1990, the Illinois Department of Nuclear Safety (Department) is authorized to *maintain a facility for the purpose of calibrating radiation detection and measuring instruments in accordance with national standards. The Department may make calibration services available to public or private entities within or outside of Illinois and may assess a reasonable fee for such services* 420 ILCS 40/25(g). The Department has established such a facility, which has been accredited as a State Regional Calibration Laboratory by the Conference of Radiation Control Program Directors, Inc. This Part sets forth the procedures to be followed by persons who request the services of this facility, the terms and conditions under which such services will be provided and the fees that the Department will charge for providing calibration services.

Section 333.20 Procedure for Requesting Calibration Services

Any person may request the Department to perform calibration services described in this Part.

- a) Requests for such services shall be in writing and addressed to the Manager, Calibration Facility, Illinois Department of Nuclear Safety, 1301 Knotts Street, Springfield, Illinois 62703.
- b) The request shall specify the type of instrument for which calibration services are requested, by instrument name and model number.

Section 333.30 Conditions

Any person who sends an instrument to the Department for calibration shall bear the cost and risk of transporting the instrument to the Department and returning the instrument to the sender. In addition, neither the Department nor the State of Illinois, nor any of their employees, agents or assignees shall be liable for any loss or damages, including without limitation, direct, consequential or special damages that may result in connection with the performance of calibration services.

Section 333.40 Calibration Services

- a) The Department provides the following calibration services under accreditation by the Conference of Radiation Control Program Directors, Inc.

- 1) X-ray Calibrations. 5 beam codes at 32 mR/sec. This service is available for the Radcal MDH 1015 x-ray monitor only. The available beam codes are:

BEAM CODE	HALF-VALUE LAYER	HOMOGENEITY COEFFICIENT
L 80	1.81 mm Aluminum	0.59
L 100	2.82 mm Aluminum	0.59
M 30	0.36 mm Aluminum	0.65
M 50	1.03 mm Aluminum	0.64
M 100	4.96 mm Aluminum	0.73

- 2) Gamma Ray Calibrations. 1 beam code. This service is available only for ion chamber and energy compensated G-M tube instruments.

BEAM CODE INTENSITIES

Cs-137 .005 - 40 R/hr

- b) The Department also provides the following services, which are not performed under accreditation.
 - 1) Microrem Meter Calibrations. 2 points per scale, gamma intensity range available to 0.015 mR/hr.
 - 2) Pocket Dosimeter Calibrations. 1 point gamma radiation up to 200 R.
 - 3) Count-Rate Instrument Calibrations. Pulse rate at 2 points per scale. Alpha probe response is checked at 2 points. Beta-gamma probes are checked at 1 point. Other checks may be performed, depending on each instrument and probe combination.
- c) The Department may be able to provide additional calibration services, including but not limited to calibrations using additional beam codes. Persons desiring any calibration services are urged to contact the facility by telephone at (217) 786-7221 to determine the availability of additional services.

Section 333.50 Fee Schedule

a)	Radcal MDH x-ray monitor calibration (maximum 2 probes)	\$235.00/ea
b)	G-M ion chamber survey instrument or microrem meter	\$75.00/ea
c)	Reference quality ion chamber calibration (1 point, 1 beam quality, either gamma or x-ray)	\$100.00/ea
d)	Pocket dosimeter calibration	\$5.00/per dosimeter (\$50 minimum charge)
e)	Count-rate instrument each additional probe	\$75.00/ea \$25.00
f)	Handling charge for any non-operational instrument received for calibration	\$25.00
g)	Other services	\$100.00/hour

Section 333.60 Other Provisions

- a) The Department will not repair or service non-functioning instruments. However, if batteries or other parts are missing from instruments sent to the Department, the Department will so advise the person sending the instrument and request that the missing parts be supplied. If the person sending the instrument fails to supply the needed items, the Department will return the instrument subject to payment of the handling fee provided in this Part.

- b) Upon completing the calibration services, the Department will return the instrument along with a bill for services rendered to the person seeking the calibration service.
- c) Payment for services shall be by check or money order, made payable to the Illinois Department of Nuclear Safety.
- d) Upon receipt of the full amount of the billing, the Department will provide a copy of the records and results of the calibration to the sender.
- e) The Department upon written request may waive all or a portion of any fee established in this Part upon making a determination that such a waiver would be in the best interests of the State of Illinois. Examples of situations in which the Department may consider a waiver include:
 - 1) When requested to service the calibration of instruments used by federal, state or local agencies in Illinois for purposes of assuring protection of the public health and safety through a cooperative agreement with the Department.
 - 2) When the person requesting the calibration service provides a service (such as making training or other resources available) to the Department in exchange for calibration services.

TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

As used in this Part, the following definitions apply:

"Act" means the Uranium and Thorium Mill Tailings Control Act 420 ILCS 42 .

"By-product material" means the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface wastes resulting from underground solution extraction processes but not including underground ore bodies depleted by such solution extraction processes.

"Department" means the Department of Nuclear Safety.

"Director" means the Director of the Department of Nuclear Safety.

"Person" means any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, agency, political subdivision of this State, any other State or political subdivision or agency thereof, and any legal successor, representative, agent, or agency of the foregoing, other than the United States Nuclear Regulatory Commission, or any successor thereto, and other than federal government agencies licensed by the United States Nuclear Regulatory Commission, or any successor thereto.

"Source material" means uranium, thorium, or any other material that the Department declares by order to be source material after the United States Nuclear Regulatory Commission or its successor has determined the material to be source material; or ores containing one or more of those materials in such concentration as the Department declares by order to be source material after the United States Nuclear Regulatory Commission or its successor has determined the material in such concentration to be source material.

Section 334.30 Payment of Fees into the By-Product Material Safety Fund

The storage fees assessed under this Part are separate and distinct from any license fees imposed under 32 Ill. Adm. Code 331.

- a) The annual fee of \$2 per cubic foot shall be assessed on the quantity of by-product material in the owner or operator's possession on January 1 of each year. The Department shall provide notice of the amount of the fee to each owner by certified mail by February 1 of each year.
- b) The quantity of material for the assessment in subsection (a) above does not include by-product material that has been at the facility for 180 days or less.
- c) *In connection with settling litigation regarding the amount of the fee to be imposed, the Director may enter into an agreement with the owner or operator of any facility specifying that the fee to be imposed shall not exceed \$26,000,000 in any calendar year* 420 ILCS 42/15(a) .
- d) Beginning in 1995, the annual fee shall be payable in equal installments on June 1, 1995, September 1, 1995, December 1, 1995 and December 31, 1995.
- e) Beginning in 1996, the annual fee shall be payable in equal quarterly installments due March 31, June 30, September 30 and December 31.
- f) Payments shall be by check or money order made payable to the Illinois Department of Nuclear Safety.
- g) If the owner or operator wishes to contest the annual fee assessment, the owner or operator may petition the

Section	
334.10	Purpose and Scope
334.20	Definitions
334.30	Payment of Fees into the By-Product Material Safety Fund
334.40	Reimbursement of Fees from the By-Product Material Safety Fund

AUTHORITY: Implementing and authorized by the Uranium and Thorium Mill Tailings Control Act (see P.A. 88-638, effective September 9, 1994 420 ILCS 42).

SOURCE: Emergency rule adopted at 19 Ill. Reg. 6014, effective April 11, 1995, for a maximum of 150 days; new Part adopted at 19 Ill. Reg. 11466, effective July 28, 1995.

Section 334.10 Purpose and Scope

- a) The purpose of this Part is to establish *an annual fee which shall be imposed on the owner or operator of any property that has been used in whole or in part for the milling of source material and is being used for the storage or disposal of by-product material, equal to \$2 per cubic foot of by-product material being stored or disposed of by the facility. However, no fees shall be collected from any State, county, municipal, or local governmental agency. Moneys collected shall be deposited by the Department into the By-product Material Safety Fund (Fund). 420 ILCS 42/15*
- b) The Department is authorized to spend money from the Fund for the following purposes:
 - (1) *the costs of monitoring, inspecting, and otherwise regulating the storage and disposal of by-product material, wherever located;*
 - (2) *the costs of undertaking any necessary maintenance, decommissioning activities, cleanup, responses to radiation emergencies, or remedial action that may be necessary in connection with by-product materials;*
 - (3) *the costs incurred by the Department arising from the transportation of the by-product material from a storage or unlicensed disposal location to a licensed permanent disposal facility. 420 ILCS 42/15(b)*
- c) In addition, the Department may reimburse *to the owner or operator of any facility used for the storage or disposal of by-product material for costs incurred by the owner or operator in connection with the decontamination or decommissioning of the storage or disposal facility or other properties contaminated with by-product material. However, the amount of the reimbursements paid to the owner or operator of a by-product material storage or disposal facility shall not exceed the amount of money paid into the Fund by that owner or operator plus the interest accrued in the Fund attributable to amounts paid by that owner or operator* 420 ILCS 42/15(b)(4) . Section 334.40 sets out the procedures to be taken by the owner or operator in requesting reimbursement from the Fund.

Section 334.20 Definitions

Department to request a hearing. This petition must be received by the Department on or before the date the payment is due. If a hearing is granted, it shall be conducted in accordance with 32 Ill. Adm. Code 200.

- h) Any person failing to pay the fees as specified in this Section may be issued a Preliminary Order and Notice of Opportunity for Hearing, and may be subject to a civil penalty. This civil penalty shall *not exceed 4 times the amount of the fees not paid* 420 ILCS 42/40(b).

Section 334.40 Reimbursement of Fees from the By-Product Material Safety Fund

- a) An owner or operator who incurs costs in connection with the decontamination or decommissioning of the storage or disposal facility or other properties contaminated with by-product material is entitled to have those costs promptly reimbursed from the Fund.
- b) An owner or operator of a facility shall submit a request for reimbursement to the Director subject to audit by the Director.
- c) The Director shall, upon receipt of a request, give written notice approving or disapproving each of the owner or operator's request for reimbursement within 60 days.
- d) The Director shall approve requests for reimbursement unless:
 - 1) The Director finds that the amount is excessive, erroneous, or otherwise inconsistent with subsection (b) above; or
 - 2) The Director finds that the amount is inconsistent with any license or license amendments issued in connection with that owner or operator's decontamination or decommissioning plan.
- e) Upon approval of a reimbursement request, the Director shall prepare and certify to the Comptroller the disbursement of the approved sums from the Fund to the owners or operators.
- f) If the Director disapproves a reimbursement request, the Director shall inform the owner or operator, in writing, the reasons for disapproval.
- g) The owner or operator may resubmit to the Department a disapproved reimbursement request with additional information to respond to the reasons for disapproval and for further consideration by the Director.
- h) Disapproval of a reimbursement request shall constitute final action for purposes of the Administrative Review Law unless the owner or operator resubmits the denied request within 35 days after receipt of denial.

TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
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PART 335
USE OF RADIONUCLIDES IN THE HEALING
ARTS

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335.9190 Resolution of Conflicting Requirements During
Transition Period

AUTHORITY: Implementing and authorized by the Radiation Protection Act of 1990 (Ill. Rev. Stat. 1991, ch. 111 1/2, pars. 210-1 et seq.) 420 ILCS 40 .

SOURCE: Adopted at 15 Ill. Reg. 10763, effective July 15, 1991; emergency amendment at 17 Ill. Reg. 9099, effective June 8, 1993, for a maximum of 150 days; amended at 18 Ill. Reg. 7308, effective May 2, 1994.

SUBPART A: GENERAL INFORMATION

Section 335.10 Purpose and Scope

This Part establishes requirements for the use of radionuclides in the healing arts and for issuance of licenses authorizing the medical use of this material. These requirements provide for the protection of the public health and safety. The requirements of this Part are in addition to, and not in substitution for, others in 32 Ill. Adm. Code: Chapter II, Subchapters b and d. The requirements of 32 Ill. Adm. Code: Chapter II, Subchapters b and d apply to applicants and licensees subject to this Part unless specifically exempted.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.15 Incorporations by Reference

All rules, standards and guidelines of agencies of the United States or nationally recognized organizations or associations that are incorporated by reference in this Part are incorporated as of the date specified in the reference and do not include any later amendments or editions. Copies of these rules, standards and guidelines that have been incorporated by reference are available for public inspection at the Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, Illinois.

(Source: Added at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.20 Definitions

"ALARA program" means a program designed to maintain effluents to unrestricted areas, occupational doses and doses to the general public as low as is reasonably achievable.

"Annually" means at intervals not to exceed 1 year.

"Area of use" means a portion of a physical structure that has been set aside for the purpose of receiving, using or storing radioactive material.

"Authorized user" means an individual who is identified as being authorized to use radioactive material on a license issued by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State.

"Brachytherapy" means a method of radiation therapy in which sealed sources, including those contained in high dose rate afterloaders, are used to deliver a radiation dose at a distance of less than 6 centimeters by surface, intracavitary or interstitial application.

"Calculated weekly administered dose" means the portion of the calculated administered dose received by the patient in 7 consecutive days.

"Case" means the performance of a clinical procedure on a patient.

"Classroom and laboratory training" means planned instruction outlined in a syllabus and offered by an individual or organization. It is comprised of lectures, demonstrations, hands-on laboratory exercises and tests.

"Clinical procedure" means a method of using radioactive material for patient care in which the material or its radiation is administered to the patient. A specific clinical procedure specifies, either explicitly or in context, the indication for the procedure, the purpose (diagnosis or therapy), the radionuclide and its chemical and physical form, the dosage or dose and method of administration and patient follow-up. Diagnostic clinical procedures also include the method of collecting raw data, manipulating the data and interpreting the final results, which may be images, graphs or numbers.

"Dedicated check source" means a radioactive source, with a half-life greater than 5 years, that is used to assure the constant operation of a radiation detection or measurement device.

"Diagnostic clinical procedures manual" means a collection of written procedures that describes each method (and other instructions and precautions) by which the licensee performs diagnostic clinical procedures. Each diagnostic clinical procedure included in this manual must be approved by the authorized user and must include the radiopharmaceutical, dosage and route of administration.

"High dose rate afterloader" means an automated device used for delivering a sealed source of high activity (typically of the magnitude of gigabecquerels or curies of activity for Ir-192) for brachytherapy.

"Licensed practitioner of the healing arts" means a person licensed under the Medical Practice Act of 1987 (Ill. Rev. Stat. 1991, ch. 111, par. 4400-1 et seq.) 225 ILCS 60 , the Illinois Dental Practice Act (Ill. Rev. Stat. 1991, ch. 111, par. 2301 et seq.) 225 ILCS 25 , or the Podiatric Medical Practice Act of 1987 (Ill. Rev. Stat. 1991, ch. 111, par. 4801 et seq.) 225 ILCS 100 .

"Management" means the chief executive officer or that individual's designee.

"Medical institution" means:

An organization, other than a medical clinic, private medical practice or mobile nuclear medicine service, that holds a specific license issued by the Department and that practices more than two medical disciplines; or

A medical clinic, private practice or mobile nuclear medicine service that holds a specific license issued by the Department and is authorized under Sections 335.5010, 335.7010 or 335.8010 to use radioactive material.

"Medical use" means the intentional internal or external administration of radioactive material, or the radiation therefrom, to humans in the practice of the healing arts.

"Output" means the exposure rate, dose rate or a quantity related in a known manner to these rates from a teletherapy unit for a specified set of exposure conditions.

"Personal participation in a complete case" means performing or observing all the steps required to perform a clinical procedure on a patient under the supervision of an authorized user. This means selection and preparation of the radiopharmaceutical, calculation, measurement and administration of the dosage or dose, operation of all the equipment used during the clinical procedure, collection and manipulation of the raw data, performing or observing the patient examination, case history review, determination of suitability for radionuclide diagnosis, interpretation of the results and follow-up for the case. For purposes of meeting training requirements, mere interpretation of the results does not constitute personal participation in a case.

"Personally performing a complete case" means performing all the steps required to perform a clinical procedure on a patient. This means selection and preparation of the radiopharmaceutical, calculation, measurement and administration of the dosage or dose, operation of all the equipment used during the clinical procedure, collection and manipulation of the raw data, performing or observing the patient examination, case history review, determination of suitability for radionuclide diagnosis, interpretation of the results and follow-up for the case. For purposes of meeting training requirements, mere interpretation of the results does not constitute personal performance in a case.

"Prescribed dosage" means the radiopharmaceutical activity as documented:

in a written directive; or

either in the diagnostic clinical procedures manual for diagnostic procedures, or as otherwise directed by the authorized user for diagnostic procedures.

"Prescribed dose" means:

for gamma stereotactic radiosurgery, the total dose as documented in the written directive;

for teletherapy, the total dose and dose per fraction as documented in the written directive; or

for brachytherapy, either the total dose or the total source strength and exposure time, as documented in the written directive.

"Recordable event" means the administration of:

radioactive material or radiation therefrom without a written directive by a procedure listed in the definition of the term "written directive";

radioactive material or radiation therefrom pursuant to a written directive without daily recording the administered radiation dose or radiopharmaceutical dosage;

a therapeutic radiopharmaceutical dosage, other than iodine-125 or iodine-131 as sodium iodide, when the administered dosage differs from the prescribed dosage by more than ten percent of the prescribed dosage;

a radiopharmaceutical procedure involving greater than 1.11 MBq (30 microCi) of iodine-125 or iodine-131 as sodium iodide, when both the administered dosage differs from the prescribed dosage by more than ten percent of the prescribed dosage, and the difference between the administered dosage and prescribed dosage exceeds 555 kBq (15 microCi);

a teletherapy radiation dose when the calculated weekly administered dose is 15 percent greater than the weekly prescribed dose; or

a brachytherapy radiation dose when the calculated administered total dose differs from the prescribed dose by more than ten percent of the prescribed dose.

"Quarterly" means at intervals not to exceed 3 months.

"Reportable event" means the administration of:

a therapeutic radiopharmaceutical dosage other than iodine-125 or iodine-131 as sodium iodide:

involving the wrong patient, wrong radiopharmaceutical the wrong route of administration; or

when the administered dosage differs from the prescribed dosage by more than 20 percent of the prescribed dosage;

a radiopharmaceutical dosage in quantities greater than 1.11 MBq (30 microCi) of iodine-125 or iodine-131 as sodium iodide:

involving the wrong patient, wrong radiopharmaceutical; or

when both the total administered dosage differs from the prescribed dosage by more than 20 percent of the prescribed dosage, and the difference between the administered dosage and prescribed dosage exceeds 1.11 MBq (30 microCi);

a gamma stereotactic radiosurgery radiation dose:

involving the wrong patient or wrong treatment site; or

when the calculated total administered dose differs from the total prescribed dose by more than ten percent of the total prescribed dose;

a teletherapy radiation dose:

involving the wrong patient, wrong treatment modality, the wrong treatment site;

when the treatment consists of three or fewer fractions and the calculated total administered dose differs from the total prescribed dose by more than ten percent of the total prescribed dose;

when the calculated weekly administered dose is 30 percent greater than the weekly prescribed dose; or

the calculated total administered dose differs from the prescribed dose by more than 20 percent of the prescribed dose;

a brachytherapy radiation dose:

involving the wrong patient, wrong radioisotope or the wrong treatment site (excluding, for permanent implants, seeds that were implanted in the correct site but migrated outside the treatment site);

involving a sealed source that is leaking;

when, for a temporary implant, one or more sealed sources are not removed upon completion of the procedure; or

when the calculated total administered dose differs from the prescribed dose by more than 20 percent of the prescribed dose;

a diagnostic radiopharmaceutical dosage, other than iodine-125 or iodine-131 as sodium iodide in quantities greater than 1.11 MBq (30 microCi) both:

involving the wrong patient, the wrong pharmaceutical, the wrong route of administration or the wrong radiopharmaceutical dosage; and

when the dose to the patient exceeds 50 mSv (5 rem) effective dose equivalent or 500 mSv (50 rem) dose equivalent to any individual organ.

"Supervised clinical experience" means performing specified tasks in the clinical setting during the work day. Supervised clinical experiences provide the student with the medical knowledge and facility necessary to assure that clinical procedures will be of benefit to the patient. It is provided in the clinic, as contrasted to the classroom, because that is the most efficient way to provide the instruction. However, continuing education courses, seminars, journal clubs and other methods of clinical instruction may comprise up to 20 percent of this training and experience.

"Supervised handling experience" means performing specified tasks with equipment in the clinical setting during the work day. It is required so that the student will develop facility in performing those tasks in the work setting, as contrasted to the classroom and laboratory setting. This is usually accomplished during the "supervised clinical experience" period.

"Teletherapy" means a method of radiation therapy in which the source of radiation is at a distance of 6 centimeters or more from the area being treated.

"Teletherapy physicist" means the individual identified as the teletherapy physicist on a radioactive material license.

"Visiting authorized user" means a temporary (i.e., less than 60 days each year) authorized user who is not identified on the license of the licensee being visited and who has been approved by the Radiation Safety Committee in accordance with Section 335.1060(b).

"Weekly prescribed dose" means the portion of the prescribed dose to be delivered in 7 consecutive days.

"Written directive" means a written order for a specific patient, dated and signed by an authorized user prior to the administration of a radiopharmaceutical or radiation except as authorized under "all other brachytherapy" below, containing the following information:

therapeutic administration of a radiopharmaceutical other than iodine-125 or iodine-131 as sodium iodide: the radiopharmaceutical, dosage and route of administration;

any administration of iodine-125 or iodine-131 as sodium iodide involving quantities greater than 1.11 MBq (30 microCi): the dosage;

gamma stereotactic radiosurgery: target coordinates, collimator size, plug pattern and total dose;

teletherapy: the total dose, dose per fraction, treatment site and overall treatment period;

high dose rate remote afterloading brachytherapy: the radionuclide, treatment site and total dose; or

all other brachytherapy:

prior to implantation, the radionuclide, number of sources and source strengths; and

after implantation but prior to completion of the procedure, the radionuclide, treatment site, and total source strength and exposure time (or equivalently, the total dose).

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.30 License Required

- a) No person shall manufacture, produce, acquire, receive, possess, use or transfer radioactive material for medical use except in accordance with a specific license issued in accordance with 32 Ill. Adm. Code 330.
- b) Unless prohibited by license condition, an individual may receive, possess, use or transfer radioactive material in accordance with this Part under the supervision of an authorized user as provided in Section 335.1050.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.40 License Amendments

For specific licenses issued pursuant to 32 Ill. Adm. Code 330.260(a) or 330.260(b), a licensee's management shall apply for and shall receive a license amendment:

- a) Before using radioactive material for any use not permitted by the license;

- b) Before permitting anyone, except a visiting authorized user described in Section 335.1060, to work as an authorized user under the license;
- c) Before changing the Radiation Safety Officer or teletherapy physicist. If the teletherapy physicist named on the license is no longer performing his or her duties, the Radiation Safety Committee may have the duties performed by an individual who is listed by name as a teletherapy physicist on a Department, U.S. Nuclear Regulatory Commission or Agreement State license, and who meets the training criteria listed in Section 335.9150, for up to 90 days while an amendment is being obtained;
- d) Before receiving radioactive material in excess of the amount authorized on the license;
- e) Before adding to or changing any area of use identified on the license, including changing the shielding in a teletherapy suite or changing the shielding in or location of a room containing a high dose rate afterloader;
- f) Before changing statement, representations and procedures that are incorporated into the license; and
- g) Within 30 days after a Radiation Safety Officer or teletherapy physicist permanently discontinues performance of duties under the license, or after changing the name or the mailing address of the licensee as it appears on the license.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

SUBPART B: GENERAL ADMINISTRATIVE REQUIREMENTS

Section 335.1010 ALARA Program

- a) Each licensee shall develop and implement a written program designed to maintain radiation doses and releases of radioactive material in effluents to unrestricted areas as low as is reasonably achievable. The licensee shall retain a current written description of the ALARA program for the duration of the license. The written description shall include:
 - 1) A commitment by management to keep occupational doses and releases of radioactive material in effluents as low as is reasonably achievable;
 - 2) A requirement that the Radiation Safety Officer brief management at least once each year on the radiation safety program;
 - 3) Personnel dose investigational levels that, when exceeded, will initiate an investigation by the Radiation Safety Officer of the cause of the dose; and
 - 4) Personnel dose investigational levels that, when exceeded, will within 24 hours initiate an investigation by the Radiation Safety Officer of the cause of the dose and a consideration of actions that might be taken to reduce the probability of recurrence.
- b) To satisfy the requirements of subsection (a) above:
 - 1) The management, Radiation Safety Officer and all authorized users shall participate in the establishment, implementation and operation of the ALARA program.
 - 2) For licensees that are not medical institutions, management and all authorized users shall participate in the program as requested by the Radiation Safety Officer.
 - 3) The ALARA program shall include notice to workers of the program's existence and workers'

responsibility to help keep radiation doses as low as is reasonably achievable.

- c) The ALARA program shall include an annual review by the Radiation Safety Committee for medical institutions, or management and the Radiation Safety Officer for licensees that are not medical institutions. The annual review shall include summaries of:
 - 1) The types and amounts of radioactive material used;
 - 2) Occupational dose reports;
 - 3) All license conditions and regulations as they relate to the licensee's program; and
 - 4) Continuing education and training provided to personnel as required by 32 Ill. Adm. Code 400.120.
- d) The purpose of the review is to ensure that individuals make every effort to maintain occupational doses, doses to the general public and releases of radioactive material as low as is reasonably achievable.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.1020 Radiation Safety Officer

- a) A licensee shall appoint a Radiation Safety Officer responsible for implementing the radiation safety program. The licensee, through the Radiation Safety Officer, shall ensure that radiation safety activities are being performed in accordance with the license provisions and regulatory requirements in the daily operation of the licensee's radioactive material program.
- b) The Radiation Safety Officer shall:
 - 1) Investigate overexposures, accidents, recordable and reportable events, spills, losses, thefts, unauthorized receipts, unauthorized uses, unauthorized transfers, unauthorized disposals and other deviations from approved radiation safety practices approved by the Radiation Safety Officer or the Department and implement corrective actions as necessary;
 - 2) Implement written policy and procedures for:
 - A) Authorizing the purchase of radioactive material;
 - B) Receiving and opening packages of radioactive material;
 - C) Storing radioactive material;
 - D) Keeping an inventory record of radioactive material;
 - E) Using radioactive material safely;
 - F) Taking emergency action if control of radioactive material is lost;
 - G) Performing radiation surveys as required by the license or this Part or 32 Ill. Adm. Code 330 or 340;
 - H) Performing operability checks of survey instruments and other safety equipment;
 - I) Disposing of radioactive material in accordance with the requirements of 32 Ill. Adm. Code 340.1010;
 - J) Providing or supervising the provision of radiation safety training to personnel who work in or frequent areas where radioactive material is used or stored; and
 - K) Keeping copies of the license and 32 Ill. Adm. Code: Chapter II, Subchapters b and d and all records, reports and written policies and procedures required thereunder.
 - 3) For medical use at a facility other than a medical institution, approve or disapprove radiation safety

program changes with the advice and consent of management prior to submittal to the Department for licensing action.

- 4) For medical use at a medical institution, assist the Radiation Safety Committee in the performance of its duties as specified in Section 335.1030.
- 5) Maintain, for a period of 5 years, records of all individuals designated by the Radiation Safety Officer to perform duties or meet regulatory requirements that would otherwise be required as a duty of the Radiation Safety Officer. These records shall include:
 - A) The name of the designated individual;
 - B) A list of all duties that the Radiation Safety Officer's designee is authorized to perform;
 - C) The date upon which the designation became effective;
 - D) The signature of the Radiation Safety Officer's designee; and
 - E) The signature of the Radiation Safety Officer.
- 6) Review records generated by designees and the performance of designees quarterly. In addition, the licensee shall maintain, for Departmental inspection for a period of 5 years, records of the quarterly reviews of records generated by designees and quarterly reviews of designee performance. These records shall include:
 - A) The date of the review;
 - B) The records being reviewed or the name of the designee being reviewed;
 - C) A list of all duties reviewed by the Radiation Safety Officer for the designee review;
 - D) The results of the Radiation Safety Officer's review and any corrective measures taken, if applicable, based on the review; and
 - E) The signature of the Radiation Safety Officer.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.1030 Radiation Safety Committee

Each medical institution licensee shall establish a Radiation Safety Committee to oversee the use of radioactive material.

- a) The Committee shall meet the following administrative requirements:
 - 1) Membership shall consist of at least three individuals and shall include an authorized user of each type of use permitted by the license, the Radiation Safety Officer, a representative of management who is neither an authorized user nor a Radiation Safety Officer and, for license authorizing the therapeutic uses described in Subparts F and H below, a representative of the nursing service.
 - 2) The Committee shall meet at least once each calendar quarter.
 - 3) To establish a quorum and to conduct business, at least one-half of the Committee membership must be in attendance, and shall include, at a minimum, the management's representative, an authorized user and the Radiation Safety Officer. However, no more than once per year, the Radiation Safety Officer's designee may substitute for the Radiation Safety Officer, provided that the designee has been provided a written report. The report shall include all information necessary for that meeting, such as the minutes of the previous Committee meeting as

required by subsection (a)(5) below and reports by the Radiation Safety Officer. Reports by the Radiation Safety Officer shall include reports of investigations required by Section 335.1020(b)(1) above and information necessary for the reviews required by subsections (b)(5) and (b)(6) below. To maintain membership on the Committee, a member must attend at least one-half of the meetings held in any year.

- 4) The minutes of each Radiation Safety Committee meeting shall include:
 - A) The date of the meeting;
 - B) Members in attendance;
 - C) Members absent;
 - D) Summary of deliberations and discussions;
 - E) Recommended actions and the results of all votes; and
 - F) Documentation of the radiation protection program review required by 32 Ill. Adm. Code 340.110(c) and the ALARA program review required by Section 335.1010(c).
- 5) The Committee shall provide each member with a copy of the meeting minutes before the next meeting and retain one copy for 5 years from the meeting date.
- b) To oversee the use of licensed material, the Committee shall:
 - 1) Monitor the institutional program to maintain individual and collective doses as low as is reasonably achievable;
 - 2) Review and approve or disapprove any individual who is to be listed as an authorized user, Radiation Safety Officer or teletherapy physicist before submitting a license application or request for amendment or renewal. Such review and approval shall be on the basis of safety and with regard to the training and experience standards of this Part;
 - 3) Review on the basis of safety and approve or disapprove each proposed method of use of radioactive material;
 - 4) Submit to the Department, for licensing action, only those procedures and radiation safety program changes that have been reviewed by the Committee on the basis of safety, and have been approved with the advice and consent of the Radiation Safety Officer and the management representative;
 AGENCY NOTE: This approval may be obtained either by vote at a meeting of the Radiation Safety Committee or by written approval of the individual members of the Committee.
 - 5) Review quarterly, with the assistance of the Radiation Safety Officer, the records of individual monitoring results of all individuals for whom monitoring was required pursuant to 32 Ill. Adm. Code 340.520;
 - 6) Review quarterly all recordable and reportable events and incidents involving radioactive material with respect to cause and subsequent actions taken. These reviews shall be with the assistance of the Radiation Safety Officer;
 - 7) Review annually the radiation safety program. These reviews shall be with the assistance of the Radiation Safety Officer; and
 - 8) Establish investigational levels for occupational dose that, when exceeded, shall require investigations and considerations of action by the Radiation Safety Officer.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.1040 Statement of Authorities and Responsibilities

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

- a) A licensee shall provide the Radiation Safety Officer, and also at a medical institution the Radiation Safety Committee, the authority, organizational freedom and management prerogative to:
 - 1) Identify actual or potential radiation safety hazards;
 - 2) Initiate, recommend or provide solutions to actual or potential radiation safety hazards; and
 - 3) Verify implementation of corrective actions.
- b) A licensee shall establish, in writing, the authorities, duties, responsibilities and radiation safety activities of the Radiation Safety Officer, and also at a medical institution the Radiation Safety Committee.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.1050 Supervision

- a) A licensee who permits the receipt, possession, use or transfer of radioactive material by an individual other than a physician under the supervision of an authorized user as allowed by Section 335.30 shall:
 - 1) Document instruction provided to the supervised individual, prior to assuming duties requiring the handling of radioactive materials, regarding the principles of radiation safety appropriate to that individual's use of radioactive material;
 - 2) Review the supervised individual's use of radioactive material, provide reinstruction and review records kept to reflect this use;
 - 3) Require the authorized user or Radiation Safety Officer to be available to communicate with the supervised individual; and
 - 4) Allow only those individuals who are accredited by the Department pursuant to 32 Ill. Adm. Code 401.100 or exempt from accreditation by 32 Ill. Adm. Code 401.30, and designated in writing by the licensee, to administer radionuclides or radiation to patients.
- b) A licensee who permits the receipt, possession, use or transfer of radioactive material by a physician under the supervision of an authorized user as allowed by Section 335.30 shall:
 - 1) Review the supervised individual's use of radioactive material, provide reinstruction and review records kept to reflect this use;
 - 2) Require the authorized user to be available to communicate with the supervised individual; and
 - 3) Maintain a record of each supervised individual for a period of 5 years from the initiation of the supervised training. This record shall include the name of each supervised individual, the results of reviews required by subsection (b)(1) above, a description of what procedures the supervised individual is approved to perform and the signature of the supervising authorized user.
- c) A licensee shall require the supervised individual receiving, possessing, using or transferring radioactive material under Section 335.30 to:
 - 1) Follow the instructions of the supervising authorized user;
 - 2) Follow the procedures established by the Radiation Safety Officer; and
 - 3) Comply with this Part and 32 Ill. Adm. Code 310, 330, 340, 341, 400 and 401 and the license conditions with respect to the use of radioactive material.

Section 335.1060 Authorized User and Visiting Authorized User

- a) A licensee shall assure that only authorized users of radioactive material who are licensed practitioners of the healing arts:
 - 1) Select or establish written criteria for the selection of the patients to receive radioactive material or radiation therefrom;
 - 2) Prescribe the radiopharmaceutical dosage or radiation dose to be administered; and
 - 3) Interpret the results of tests, studies or treatments.
- b) A licensee may permit any visiting authorized user to use licensed material for medical use under the terms of the licensee's license for up to 60 days each year without applying for a license amendment if:
 - 1) The physician is licensed in accordance with the Medical Practice Act of 1987;
 - 2) The visiting authorized user has the prior written permission of the licensee's management and, if the use occurs on behalf of an institution, the institution's Radiation Safety Committee;
 - 3) The licensee has a copy of a license issued by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State that identifies the visiting authorized user by name as an authorized user; and
 - 4) The visiting authorized user performs only those procedures for which the visiting authorized user is specifically authorized by a license described in subsection (3) above.
- c) A licensee shall retain copies of the records specified in subsection (b) for 5 years.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.1070 Mobile Nuclear Medicine Service Administrative Requirements

- a) Prior to bringing radioactive material into a client's facility, mobile nuclear medicine service licensees shall obtain a letter, signed by the management of the client for whom services are rendered, that authorizes use of radioactive material at the client's address of use. The mobile nuclear medicine service licensee shall retain the letter for 5 years after the last provision of service.
- b) If a mobile nuclear medicine service provides services that the client is also authorized to provide, then the mobile nuclear medicine service shall provide those services in accordance with 32 Ill. Adm. Code: Chapter II, Subchapters b and d and the requirements of the mobile nuclear medicine service's license.
- c) A mobile nuclear medicine service shall not have radioactive material delivered directly from the manufacturer or the distributor to the mobile nuclear medicine service company's client.
- d) The mobile nuclear medicine service shall retain a record of all dosages administered under the service's license for 5 years after the date of administration. This record shall include the radiopharmaceutical name, the clinical procedure, the activity administered, the name of the authorized user, the date of administration and the identity of the individual performing the administration.
- e) A mobile nuclear medicine licensee may permit a physician to use licensed material for medical use under the terms of the mobile nuclear medicine service's license without applying for a license amendment if:

- 1) The physician has the prior written permission of the mobile nuclear medicine service's management;
 - 2) The mobile nuclear medicine service has a copy of a license issued by the Department, U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State that identifies the physician by name as an authorized user for medical use;
 - 3) The physician performs only those procedures for which the physician is specifically authorized by a license described in subsection (2) above; and
 - 4) The mobile nuclear medicine service license shall retain a copy of the physician's authorization for 5 years after the physician's most recent performance of service.
- f) Mobile nuclear medicine licensees shall comply with the ALARA program requirements of Section 335.1010.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.1080 Notifications, Reports and Records of Reportable Events

- a) For any administration of radioactive material or radiation that results in a reportable event:
- 1) The licensee shall notify the Department by telephone no later than the next day after the licensee ascertains and confirms that a reportable event has occurred.
 - 2) The licensee shall submit a written report to the Department within 15 days after the licensee ascertains and confirms that a reportable event has occurred. The written report must include the licensee's name; the prescribing physician's name; a brief description of the reportable event; why the reportable event occurred; the effect on the patient; what improvements are needed to prevent recurrence; actions taken to prevent recurrence; whether the licensee informed the patient (or the patient's responsible relative or guardian), and if not, why not; and if the patient was informed, what information was provided to the patient. The report must not include the patient's name or other information that could lead to identification of the patient.
 - 3) The licensee shall notify the patient of the reportable event within 15 days after the licensee ascertains and confirms that a reportable event has occurred, unless the referring physician agrees to inform the patient or believes, based on medical judgment, that telling the patient would be harmful. If the referring physician or patient cannot be reached within 15 days, the licensee shall notify them as soon as practicable. The licensee is not required to notify the patient without first consulting the referring physician; however, the licensee shall not delay any appropriate medical care for the patient because of any delay in notification.
 - 4) If the patient was notified, the licensee shall also furnish a written report to the patient within 15 days after the licensee ascertains and confirms that a reportable event has occurred. The report to the patient shall be either a copy of the report that was submitted to the Department or a brief description of both the event and the consequences, as they may affect the patient, provided that a statement is included that the report submitted to the Department can be obtained from the licensee.

- b) Each licensee shall retain a record of each reportable event for 5 years. The record must contain the names of all individuals involved in the reportable event (including the prescribing physician, allied health personnel, the patient and the patient's referring physician), the patient's social security number or identification number if one has been assigned, a brief description of the reportable event, why the reportable event occurred, the effect on the patient, what improvements are needed to prevent recurrence and the actions taken to prevent recurrence.
- c) Aside from the notification requirement, nothing in this Section affects any rights or duties of licensees and physicians in relation to each other, patients or the patient's responsible relatives or guardians.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.1090 Materials Authorized for Medical Use

A licensee shall utilize only the following for medical use:

- a) Radioactive material prepared, manufactured, labeled, packaged and distributed in accordance with a license issued pursuant to 32 Ill. Adm. Code 330 or the equivalent regulations of the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State; and
- b) Reagent kits that have been manufactured, labeled, packaged and distributed in accordance with an approval issued by the Department, the U.S. Department of Health and Human Services, Food and Drug Administration (FDA), the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

SUBPART C: GENERAL TECHNICAL REQUIREMENTS

Section 335.2010 Possession, Use, Calibration and Check of Dose Calibrators

- a) A medical use licensee that is authorized to administer radiopharmaceuticals shall possess a dose calibrator and use it to measure the amount of activity administered to each patient.
- b) A licensee shall:
 - 1) Check each dose calibrator for constancy with a dedicated check source at the beginning of each day of use. To satisfy the requirement of this subsection, the check shall be done on all settings to be used that day with a sealed source of not less than 370 kBq (10 microCi) of radium-226 or 1.85 MBq (50 microCi) of any other photon-emitting radionuclide with a half-life greater than 90 days. The licensee shall make a record of the results of these checks. The record shall include the model and serial number of the dose calibrator, the identity of the radionuclide contained in the check source, the date of the check, the activity measured, the instrument settings and the identity of the individual who performed the check;
 - 2) Test each dose calibrator for accuracy upon installation, and thereafter at intervals not to exceed 12 months. The licensee shall make a record of these tests which shall include the model, serial number, radionuclide, activity and activity assay date of each source used, the manufacturer, model and serial number of the dose calibrator, the date and results of the accuracy test and the signatures or

initials of the Radiation Safety Officer and the individual who performed the test. These tests shall be performed by assaying at least the following three sealed sources, the activity of which the manufacturer, National Bureau of Standards or the National Institute of Standards and Technology has determined within five percent of the stated activity:

- A) Cesium-137, minimum 3.7 MBq (100 microCi) source;
 - B) Barium-133, minimum 3.7 MBq (100 microCi) source;
 - C) Cobalt-57, minimum 37 MBq (1 mCi) source;
- 3) Test each dose calibrator for linearity upon installation and thereafter at intervals not to exceed 3 months, over the range of use from the lowest to the highest dosage that will be administered. The licensee shall also make a record of these tests. These records shall include the model and serial number of the dose calibrator, the calculated activities, the measured activities, the date(s) and time(s) of the test, the identity of the individual performing the test and the signature or initials of the Radiation Safety Officer; and
 - 4) Test each dose calibrator for geometry dependence upon installation over the range of volumes and volume configurations for which it will be used. The licensee shall make a record of this test. The record shall include the model and serial number of the dose calibrator, the activity and configuration of the source measured, the activity measured for each volume measured, the instrument setting for each volume measured, the date of the test, the identity of the individual performing the test and the signature or initials of the Radiation Safety Officer.
- c) A licensee shall mathematically correct dosage readings for any geometry or linearity error that exceeds ten percent if the dosage is greater than 370 kBq (10 microCi) and shall repair or replace the dose calibrator if the accuracy or constantly error exceeds ten percent.
 - d) A licensee shall also perform checks and tests required by subsection (b) above following adjustment or repair of the dose calibrator, such as replacement of electronic components, that will affect constancy, linearity, accuracy or geometry dependence.
 - e) A licensee shall retain a record of each constancy check, accuracy test and linearity test required by this Section for 5 years. A licensee shall retain a record of the results of the most recent performance of the geometry dependence test for the duration of the use of the dose calibrator.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.2020 Possession, Calibration and Check of Survey Instruments

- a) A licensee authorized to use radioactive material for uptake, dilution and excretion studies shall have in its possession a portable radiation detection survey instrument capable of detecting dose rates over the range 1 microSv (100 microrem) per hour to 500 microSv (50 mrem) per hour. The instrument shall be operable and calibrated in accordance with the requirements of this Section.
- b) A licensee authorized to use radioactive material for imaging and localization studies, for radiopharmaceutical therapy or for implant therapy, excluding high dose rate afterloaders, shall have in its possession a portable

radiation detection survey instrument capable of detecting dose rates over the range 1 microSv (100 microrem) per hour to 500 microSv (50 mrem) per hour, and a portable radiation measurement survey instruments capable of measuring dose rates over the range 10 microSv (1 mrem) per hour to 10 mSv (1 rem) per hour. The instruments shall be operable and calibrated in accordance with the requirements of this Section.

- c) A licensee authorized to use radioactive material as a sealed source:
 - 1) In a teletherapy unit or high dose rate afterloader shall have in its possession either a portable radiation detection survey instrument capable of detecting dose rates over the range 1 microSv (100 microrem) per hour to 500 microSv (50 mrem) per hour or a portable radiation measurement survey instrument capable of measuring dose rates over the range 10 microSv (1 rem) per hour to 10 mSv (1 rem) per hour. The instrument shall be operable and calibrated in accordance with the requirements of this Section.
 - 2) For diagnostic purposes shall use either a portable radiation detection survey instrument capable of detecting dose rates over the range 1 microSv (100 microrem) per hour to 500 microSv (50 mrem) per hour or a portable radiation measurement survey instrument capable of measuring dose rates over the range 10 microSv (1 mrem) per hour to 10 mSv (1 rem) per hour. The instrument shall be operable and calibrated in accordance with the requirements of this Section.
- d) A licensee shall ensure that the survey instruments used to show compliance with this Part have been calibrated before first use, at intervals not to exceed 1 year and following repair.
- e) To satisfy the requirement of subsection (d) above the licensee shall:
 - 1) Calibrate all required scale readings up to 10 mSv (1rem) per hour with a radiation source;
 - 2) Calibrate two readings, separated by at least 50 percent of the full-scale reading, for each scale to be calibrated;
 - 3) Post a legible note on the instrument showing the date of calibration and the apparent dose rate from a dedicated check source as determined at the time of calibration or immediately upon receipt of the calibrated instrument; and
 - 4) Ensure that survey instrument calibrations are performed by persons specifically licensed by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State to perform such services.
- f) To satisfy the requirements of subsections (e)(1) and (2) above, the licensee shall:
 - 1) Consider a point as calibrated if the indicated dose rate differs from the calculated dose rate by not more than ten percent; or
 - 2) Consider a point as calibrated if the indicated dose rate differs from the calculated dose rate by not more than 20 percent and a correction chart or graph is conspicuously attached to the instrument.
- g) Prior to using radioactive material, a licensee shall check the survey instrument to be used for required surveys with a dedicated check source on each day that instrument is used. This check source shall have a half-life greater than 5 years. These checks shall be taken with the check source placed in a specific geometry relative to the detector. If any check source reading varies greater than 20 percent from the reading measured immediately after calibration

the licensee shall require that the instrument be repaired or re-calibrated before use to determine compliance with this Part or 32 Ill. Adm. Code 340. The results of these checks shall be recorded:

- 1) After repair, battery change or instrument calibration; and
 - 2) At intervals not to exceed 3 months.
- h) The licensee shall retain a record, for 5 years, of each calibration required in subsection (d) above. The record shall include:
- 1) A copy of the licensee's calibration procedures or a copy of a license issued by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State authorizing the person that performed the calibration to perform calibrations as a customer services;
 - 2) The manufacturer, model and serial number of the instrument being calibrated; and
 - 3) The model, serial number, radionuclide, activity and activity assay date of the source used and the exposure rates from the source as provided in, or calculated from, information provided by the source supplier and the rates indicated by the instrument being calibrated, the correction factors deduced from the calibration data, the signature or initials of the individual who performed the calibration and the date of calibration.
- i) The licensee shall retain a record of each check required in subsection (g) above for 5 years. The record shall include the manufacturer, model and serial number of the instrument being checked, a description of the source used, the radiation level indicated by the instrument being checked, the identity of the individual who performed the check and the date of the check.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.2030 Assay of Radiopharmaceutical Dosages

A licensee shall:

- a) Assay, before medical use, the activity of each radiopharmaceutical dosage that contains more than 370 kBq (10 microCi) of a photon-emitting radionuclide;
- b) Assay, before medical use, the activity of each radiopharmaceutical dosage with a desired activity of 370 kBq (10 microCi) or less of a photon-emitting radionuclide to verify that the dosage does not exceed 370 kBq (10 microCi);
- c) Retain a record of the assays required by this Section for 5 years. To satisfy this requirements, the record shall contain:
 - 1) The generic name, trade name or abbreviation of the radiopharmaceutical, its lot number and expiration date or time and the radionuclide;
 - 2) The patient's name and identification number if one has been assigned;
 - 3) The prescribed dosage and activity of the dosage at the time of assay or a notation that the total activity is less than 370 kBq (10 microCi);
 - 4) The date and time of the assay;
 - 5) The date of administration of the radiopharmaceutical and the time of administration, if more than 15 minutes has elapsed between the time of assay and the time of administration; and
 - 6) The identity of the individual who performed the assay.
- d) A report of any irregularities pertaining to identification, labeling, quality or assay of any radiopharmaceutical received under the authority of this license shall be filed

within 10 days of occurrence with the Department, Division of Radioactive Materials.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.2040 Authorization for Calibration and Reference Sources

Any person authorized by Section 335.30 for medical use of radioactive material may receive, possess and use the following radioactive material for check, calibration and reference use:

- a) Sealed source manufactured and distributed by persons specifically licensed in accordance with 32 Ill. Adm. Code 330 or equivalent provisions of the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State and that do not exceed 555 MBq (15 mCi) each, except radioactive material with atomic number 83 or above shall not exceed 185 kBq (5 microCi) per source and the total of such sources shall not exceed 1.85 MBq (50 microCi). The licensee need not submit in license applications the information required by 32 Ill. Adm. Code 330.240(g)(1) provided that the licensee maintains a record for each sealed source possessed under this authorization. The record shall identify the source by manufacturer and model as indicated in an evaluation sheet issued by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State;
- b) Any radioactive material with a half-life of 100 days or less in individual amounts not to exceed 555 MBq (15 mCi);
- c) Any radioactive material with a half-life greater than 100 days in individual amounts not to exceed 7.4 MBq (200 microCi) each; and
- d) Technetium-99m in individual amounts not to exceed 1.85 GBq (50 mCi).

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.2050 Requirements for Possession of Sealed Sources

- a) A licensee in possession of any sealed source shall follow the radiation safety and handling instructions supplied by the manufacturer and shall maintain the instructions for the duration of source use in a legible form convenient to users.
- b) A licensee in possession of a sealed source shall assure that it is tested for leakage or contamination in accordance with 32 Ill. Adm. Code 340.410. In the absence of a certificate from a transferor indicating that a test has been made within the 6-month period prior to the transfer, the sealed source shall not be put into use until tested and the test results confirm that the sealed source is not leaking or contaminated.
- c) A licensee shall retain leak test records for 5 years in accordance with 32 Ill. Adm. Code 340.1135. The records shall contain the model and serial number, if assigned, of each source tested, the identity of each source radionuclide and its estimated activity, the measured activity of each test sample expressed in becquerels or microcuries, a copy of the licensee's leak test procedures or a copy of a license issued by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State authorizing the person that performed the leak test to perform leak tests as a customer service, the date of the test and the signature of the Radiation Safety Officer.
- d) A licensee in possession of a sealed source, except sealed sources in teletherapy machines not identified as being in storage, shall conduct a physical inventory of all such

sources at intervals not to exceed 3 months. The licensee shall retain each inventory record for 5 years. The inventory record shall include the radionuclide, activity and the activity assay date, manufacturer, model and serial number, the location of the sealed sources(s), date of the inventory, the identity of the person(s) who performed the inventory and the signature or initials of the Radiation Safety Officer.

- e) A licensee in possession of a sealed source shall:
 - 1) Monitor, with a radiation survey instrument, all areas where such sources are stored. These measurements shall be performed at intervals not to exceed 3 months. This monitoring requirement does not apply to teletherapy sources in teletherapy units, brachytherapy sources in high dose rate afterloaders or sealed sources in diagnostic devices.
 - 2) Retain a record of all monitoring required by subsection (e)(1) above for 5 years. The record shall include the monitoring date, a sketch of each area that was monitored, the measured dose rate at several points in each area expressed in units, multiples or subunits of sieverts or rem per hour, the manufacturer, model and serial number of the survey instrument used to perform the monitoring, the identity of the person who performed the monitoring and the signature or initials of the Radiation Safety Officer.
- f) A licensee shall submit to the Department, at intervals not to exceed 3 months, a record of all brachytherapy and teletherapy sources not being used and identified as in storage. This record shall include copies of the inventory records required by subsection (d) above and the monitoring records required by subsection (e)(2) above.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.2060 Syringe Shields and Syringe Shield Labels

- a) A licensee shall keep in a radiation shield, syringes that contain radioactive material to be administered.
- b) A licensee shall use syringe radiation shields unless the use of a shield is contraindicated for an individual patient. AGENCY NOTE: The use of a syringe radiation shield could be contraindicated if a patient presented a venous anatomy poorly suited for venipuncture.
- c) Notwithstanding the provisions of 32 Ill. Adm. Code 340.940(a) and 340.950, a licensee shall label each syringe or syringe radiation shield that contains a syringe with a radiopharmaceutical with either the radiopharmaceutical name, or its abbreviation, or the procedure to be performed or the patient's name.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.2070 Vial Shields and Vial Shield Labels

- a) A licensee shall use vial radiation shields when preparing or handling vials containing radiopharmaceuticals.
- b) Notwithstanding the provisions of 32 Ill. Adm. Code 340.940(a) and 340.950, a licensee shall label each vial radiation shield that contains a vial of a radiopharmaceutical with the radiopharmaceutical name or its abbreviation.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.2080 Monitoring for Contamination and Ambient Radiation Dose Rate

- a) At the end of each day of use, the licensee shall monitor with a radiation detection survey instrument all areas where liquid radiopharmaceuticals were prepared for use or administered. However, when diagnostic radiopharmaceuticals are administered to a hospitalized patient in the patient's room, the licensee need not monitor the area where the radiopharmaceuticals were administered.
- b) At least once each week, a licensee shall monitor with a radiation detection survey instrument all areas where radiopharmaceuticals or radioactive wastes are stored.
- c) A licensee shall conduct the monitoring required by subsections (a) and (b) above in a manner that allows detection of dose rates as low as 1 microSv (100 microrem) per hour.
- d) At least once each week, a licensee shall monitor for removable contamination all areas where radiopharmaceuticals are prepared for use, administered or stored.
- e) A licensee shall conduct the monitoring required by subsection (d) above in a manner that permits detection of contamination on each wipe sample of 2000 dpm per 100 square centimeters of surface area.
- f) A licensee shall retain a record of all monitoring required by this Section for 5 years. The record shall include the monitoring date, a sketch of each area monitored, the measured dose rate at several points in each area expressed in units, multiples or subunits of sieverts or rem per hour or the removable contamination in each area expressed in units, multiples or subunits of becquerels or curies per 100 square centimeters of surface area or in disintegrations (transformations) per minute per 100 square centimeters of surface area, the manufacturer, model and serial number of the instrument used to perform the monitoring or analyze the samples and the identity of the individual who performed the monitoring.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.2090 Safety Instructions for Patients Not Hospitalized and Containing Therapeutic Doses of Radiopharmaceuticals or Permanent Implants

The licensee shall provide safety instructions to patients who are not hospitalized for compliance with Section 335.2100 and to any therapy patient administered 555 MBq (15 mCi) or more of iodine-131 or to the family or guardian of such patient. This information shall be provided orally or in writing.

AGENCY NOTE: Because the patient is a potential source of radiation dose to his or her family and to other members of the public, it is necessary for the patient or the family or guardian of the patient to be provided with safety instructions to be followed to limit unnecessary radiation dose to others.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.2100 Admission of Patients Being Treated with Radiopharmaceuticals or Permanent Implants

A licensee shall admit any patient for administration of a permanent implant or 1.11 GBq (30 mCi) or more of a therapeutic radiopharmaceutical, if the patient's dose rate at 1 meter is expected to exceed 50 microSv (5 mrem) per hour.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.2110 Discharge of Patients Being Treated with Therapeutic Doses of Radiopharmaceuticals or Permanent Implants

Patients administered a permanent implant or 1.11 GBq (30 mCi) or more of a therapeutic radiopharmaceutical may be discharged from the hospital only after all of the following conditions have been met:

- a) A physician, authorized to perform therapeutic procedure using radiopharmaceuticals or permanent implants, has authorized the discharge;
 - b) The measured dose rate from the patient is less than either 50 microSv (5 mrem) per hour at a distance of 1 meter or the radioactive material remaining in the patient is calculated to be less than 1.11 GBq (30 mCi); and
 - c) For any therapy patient whose measured dose rate at 1 meter is greater than 20 microSv (2 mrem) per hour, the licensee has provided instruction orally or in writing to the patient, or the family or guardian of the patient.
- AGENCY NOTE: Because the patient is a potential source of radiation dose to his or her family and to other members of the public, it is necessary for the patient or the family or guardian of the patient to be provided with safety instructions to be followed to limit unnecessary radiation dose to others.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.2120 Mobile Nuclear Medicine Service Technical Requirements

A licensee providing mobile nuclear medicine service shall:

- a) Transport to each address of use only those syringes or vials containing prepared radiopharmaceuticals or radiopharmaceuticals that are intended for reconstitution of radiopharmaceutical kits;
- b) Bring into each location of use all radioactive material to be used and, before leaving, remove all unused radioactive material and associated radioactive waste;
- c) Secure or keep under constant surveillance and immediate control all radioactive material when in transit or at a location of use;
- d) Check survey instruments and dose calibrators for proper function before medical use at each location of use, as required by Sections 335.2010(b)(1) and 335.2020(g);
- e) Carry a calibrated survey instrument in each vehicle that is being used to transport radioactive material, and before leaving a client location of use, monitor all areas of radiopharmaceutical use with a radiation detection survey instrument to ensure that all radiopharmaceuticals and all associated radioactive wastes have been removed; and
- f) Retain a record of the monitoring required by subsection (e) above for 5 years. The record shall include the monitoring date, a plan of each area that was monitored, the measured dose rate at several points in each area of use expressed in units, multiples or subunits of sieverts or rem per hour, the manufacturer, model and serial number of the instrument used to perform the monitoring and the identity of the individual who performed the monitoring.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.2130 Storage of Volatiles and Gases

- a) A licensee shall store radioactive gases and volatile radiopharmaceuticals, including iodine as sodium iodide, in the shipper's radiation shield and container, or
- b) A licensee shall store containers from which multiple doses are extracted in a properly functioning, ventilated device such as a glove box or fume hood.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

SUBPART D: UPTAKE, DILUTION AND EXCRETION**Section 335.3010 Use of Radiopharmaceuticals for Uptake, Dilution or Excretion Studies**

A licensee may use any radioactive material in a radiopharmaceutical approved by the U.S. Food and Drug Administration (FDA) for a diagnostic use involving measurements of uptake, dilution or excretion.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

SUBPART E: IMAGING AND LOCALIZATION**Section 335.4010 Use of Radiopharmaceuticals, Generators and Reagent Kits for Imaging and Localization Studies**

A licensee may use any radioactive material in a diagnostic radiopharmaceutical approved by the U.S. Food and Drug Administration (FDA) or any generator or any reagent kit for preparation and diagnostic use of a radiopharmaceutical containing radioactive material.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.4020 Permissible Molybdenum-99 Concentration

- a) A licensee shall not administer to humans a radiopharmaceutical containing more than 150 Bq of molybdenum-99 per MBq of technetium-99m (0.15 microCi of molybdenum-99 per mCi of technetium-99m) or more than 185 kBq (5 microCi) of molybdenum-99 per administered dose at the time of administration.
- b) A licensee preparing technetium-99m radiopharmaceuticals from molybdenum-99/technetium-99m generators shall measure the molybdenum-99 concentration in each eluate or extract.
- c) A licensee who is required to measure molybdenum concentration shall retain a record of each measurement for 5 years. The record shall include, for each elution or extraction of technetium-99m, the measured activity of the technetium expressed in megabecquerels or millicuries, the measured activity of the molybdenum expressed in becquerels or microcuries, the ratio of the measures expressed as becquerels or microcuries of molybdenum per megabecquerel or millicurie of technetium, the time and date of the test and the identity of the individual who performed the test.
- d) A licensee shall report immediately to the Department each occurrence of molybdenum-99 concentration exceeding the limits specified in subsection (a) above.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.4030 Control of Aerosols and Gases

- a) A licensee who administers radioactive aerosols or gases shall do so with a system that will keep airborne concentrations within the limits prescribed by 32 Ill. Adm. Code 340.
- b) The system shall either be directly vented to the atmosphere through an air exhaust or provide for collection and decay or disposal of the aerosol or gas in a shielded container.

- c) A licensee shall administer radioactive gases only in rooms that are at negative pressure compared to surrounding rooms or hallways.
- d) A licensee shall post at the area of use emergency procedures to be followed in the event of a gas spill.
- e) In the event of evacuation because of a spill, the licensee shall use a radiation detection survey instrument upon room re-entry to ensure radiation levels return to background levels.
- f) A licensee shall check the operation of reusable collection systems monthly and measure the ventilation rates available in areas of use at intervals not to exceed 6 months. The licensee shall maintain a record of these checks for 5 years. The record shall include the model and serial number of the collection system, results of all checks recommended by the manufacturer of the collection system, the date of the checks and the identity of the individual who performed the checks.
- g) Contaminated charcoal trap filters, system tubing and masks shall be disposed of in accordance with 32 Ill. Adm. Code 340.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

SUBPART F: RADIOPHARMACEUTICALS FOR THERAPY

Section 335.5010 Use of Radiopharmaceuticals for Therapy

A licensee may use any radioactive material in a radiopharmaceutical for a therapeutic use provided that the U.S. Food and Drug Administration (FDA) has either accepted an "Investigational New Drug Application" (IND) or approved a "New Drug Application" (NDA).

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.5020 Safety Instruction

- a) Patients shall be instructed in radiation safety precautions relating to patient control, visitor control, contamination control and waste control.
- b) Persons who enter a patient's room shall be instructed in radiation safety precautions and procedures related to visitor control and contamination control.
- c) Attendant hospital staff shall receive annual instruction in the licensee's procedures for:
 - 1) Patient control;
 - 2) Visitor control;
 - 3) Contamination control;
 - 4) Waste control; and
 - 5) Notification of the Radiation Safety Officer or authorized user in case of the patient's death or medical emergency.
- d) A licensee shall keep for 5 years a list of the attendant hospital staff receiving instruction required by subsection (c) above, a description of the instruction, the date of instruction and the name of the individual who gave the instruction.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.5030 Safety Precautions for Radiopharmaceutical Therapy

- a) For any hospitalized patient receiving treatment with a therapeutic radiopharmaceutical the licensee shall:

- 1) Perform radiation monitoring as required by 32 Ill. Adm. Code 340.510 for use in determining when the licensee shall supply appropriate personnel with individual monitoring devices as required by 32 Ill. Adm. Code 340.520. Records of the radiation monitoring indicating the date and time of the monitoring, a plan of the area or list of points monitored, the measured dose rate, the manufacturer, model and serial number of the instrument used to perform the monitoring and the identity of the individual who performed the monitoring shall be maintained for 5 years. This radiation monitoring shall include, as a minimum, the dose rate in units, multiples or subunits of sieverts or rem per hour at:
 - A) The patient's bedside;
 - B) 1 meter from the patient;
 - C) The patient's hospital room door; and
 - D) Contiguous restricted and unrestricted areas. However, radiation monitoring of adjoining rooms is not required if a calculation of the dose rate to a patient in the adjoining room is made based on measurements obtained pursuant to subsections (a)(1)(A) or (B) above.
- 2) Prevent any patient who is not receiving radiation therapy, but who is occupying a room that adjoins the room of a patient who is receiving radiation therapy, to receive a dose greater than 1 mSv (100 mrem) during the patient's entire stay from radiation emitted by any therapy patient. The licensee shall verify compliance by performing radiation surveys based on the monitoring required by subsection (a)(1) above.
- 3) Prevent the placement of a therapy patient in the same room with a patient who is not receiving radiopharmaceutical therapy unless the licensee demonstrates, by monitoring or surveys, compliance with the requirements of 32 Ill. Adm. Code 340.310 at a distance of 1 meter from the therapy patient.
- 4) Provide each therapy patient's room with a private sanitary facility.
- 5) Post the patient's door with a "Caution: Radiation Area" sign. The posted sign shall indicate that pregnant women, or women who suspect that they are pregnant, shall contact the attendant staff for additional safety instructions or precautions. Also, a note shall appear on the door and on the patient's chart which states where and how long visitors may stay in the patient's room.
- 6) Authorize visits by individuals under age 18 only on a patient-by-patient basis with the approval of the radiation therapy physician after consultation with the Radiation Safety Officer.
- 7) Maintain and make available nursing instructions for the attendant nursing staff that list any restrictions and instructions that shall be followed regarding the care of therapy patients.
- 8) Either monitor all items removed from the patient's room to determine that any contamination cannot be distinguished from the natural background radiation level with a radiation detection survey instrument set on its most sensitive scale and with no interposed shielding other than a plastic or cloth bag or handle all items removed from the patient's room as radioactive waste.
- 9) Advise attendant nursing staff to notify the Radiation Safety Officer or the radiation therapy

physician immediately if the therapy patient dies or has a medical emergency.

- 10) Monitor the patient's room and sanitary facility for removable contamination. The room shall not be re-assigned until removable contamination is less than 2000 dpm per 100 square centimeters of surface area.
- 11) Measure the thyroid burden of each individual who helped prepare or administer a dosage of iodine-131 within the interval of 12 hours to 3 days after administering the dosage. Retain a record that includes each thyroid burden measurement, the name of the individual whose thyroid burden was measured, the identity of the individual who made the measurements and either the thyroid burden or dose equivalent to the thyroid gland. If monitoring was required pursuant to 32 Ill. Adm. Code 340.520, records shall be maintained in accordance with 32 Ill. Adm. Code 340.1160. If monitoring was not required pursuant to 32 Ill. Adm. Code 340.520, then records shall be maintained for a period of 5 years.
- b) The licensee shall implement the precautions required by subsections (a)(1) through (8) above until all of the following conditions have been met:
 - 1) The measured dose rate at 1 meter from the therapy patient is less than 50 microSv (5 mrem) per hour.
 - 2) Radiation monitoring of potentially contaminated items indicate no contamination.
 - 3) 48 hours have passed since the administration of iodine-125 or iodine-131 as a therapeutic radiopharmaceutical.
- c) Records of monitoring required by subsections (a)(8), (10) and (b)(1) above shall include the monitoring date, the type of monitoring (i.e., room, item, patient, etc.), the measured dose rate expressed in units, multiples or subunits of sieverts or rem per hour or the removable contamination in each area expressed in units, multiples or subunits of becquerels or curies per 100 square centimeters of surface area or in disintegrations (transformations) per minute per 100 square centimeters of surface area, the manufacturer, model and serial number of the radiation survey instrument used and the identity of the individual who performed the monitoring.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

SUBPART G: SEALED SOURCES FOR DIAGNOSIS

Section 335.6010 Use of Sealed Sources for Diagnosis

A licensee shall use the following sealed sources in accordance with the manufacturer's radiation safety and handling instructions:

- a) Iodine-125 as a sealed source in a device for bone mineral analysis;
- b) Americium-241 as a sealed source in a device for bone mineral analysis;
- c) Gadolinium-153 as a sealed source in a device for bone mineral analysis; and
- d) Iodine-125 as a sealed source in a portable device for imaging.

SUBPART H: SEALED SOURCES FOR BRACHYTHERAPY

Section 335.7010 Use of Sealed Sources for Brachytherapy

A licensee shall use sealed sources in accordance with the uses approved by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State and in accordance with the manufacturer's radiation safety and handling instructions.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.7020 Safety Instruction

- a) The licensee shall provide oral and written radiation safety instruction to all personnel prior to their assuming independent care (i.e., care provided when an authorized user or Radiation Safety Officer is not physically present) of a patient receiving implant therapy. Refresher training shall be provided at intervals not to exceed 1 year.
- b) To satisfy the requirements of subsection (a) above, the instruction shall describe:
 - 1) Size and appearance of the brachytherapy sources;
 - 2) Safe handling and shielding instructions in case of a dislodged or disconnected source;
 - 3) Procedures for control of patients who are not receiving radiation therapy that establish compliance with 32 Ill. Adm. Code 340.310;
 - 4) Procedures for control of visitors that establish compliance with 32 Ill. Adm. Code 340.310; and
 - 5) Procedures for notification of the Radiation Safety Officer or authorized user if the patient dies or has a medical emergency.
- c) A licensee shall retain for 5 years a record of individuals receiving instruction required by subsection (a) above, a description of the instruction, the date of instruction and the identity of the individual who gave the instruction.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.7030 Safety Precautions

A licensee shall, for each patient receiving implant therapy:

- a) Prevent the placement of that patient in the same room with a patient who is not receiving therapy unless the licensee demonstrates, by monitoring or surveys, compliance with the requirements of 32 Ill. Adm. Code 340.310 at a distance of 1 meter from the implant;
- b) Post the patient's door with a "Caution: Radioactive Materials" sign and note on the door or in the patient's chart where and how long visitors may stay in the patient's room. In addition, the posted sign shall indicate that pregnant women, or women who suspect that they are pregnant, shall contact the attendant staff for additional safety instructions or precautions;
- c) Authorize visits by individuals under age 18 only on a patient-by-patient basis with the approval of the authorized user after consultation with the Radiation Safety Officer;
- d) Except for high dose rate afterloaders, within 1 hour after implanting the sources, measure the dose rates in contiguous restricted and unrestricted areas with a radiation measurement survey instrument to demonstrate compliance with 32 Ill. Adm. Code 340.310;
 AGENCY NOTE: Monitoring of adjoining rooms is not required if a calculation of the dose rate to a patient in the adjoining room is made based on measurements obtained pursuant to subsection (d) above.
- e) Advise attendant nursing staff to notify the Radiation Safety Officer or the radiation therapy physician immediately if the patient dies or has a medical emergency;
- f) Include the following information in the patient's chart:

- 1) The radionuclide administered, the number of sources implanted, the activity in units, multiples or subunits of becquerels or curies implanted and the time and date of administration;
 - 2) Except when using high dose rate afterloaders, the exposure or dose rate at 1 meter from the patient, the time the determination was made and the identity of the individual who made the determination;
 - 3) The radiation symbol; and
 - 4) Precautionary instructions to assure that the dose limits of 32 Ill. Adm. Code 340.210, 340.270, 340.280 and 340.310 are not exceeded;
- g) For high dose rate afterloaders, the licensee shall post the following information at the unit console:
- 1) Procedures to be followed to ensure that only the patient is in the treatment room before beginning a treatment or after a door interlock interruption;
 - 2) Procedures to be followed if an alarm, warning signal or monitoring indicates the source has not returned to its safe position;
 - 3) The names and telephone numbers of the Radiation Safety Officer and authorized users to be contacted in the event the unit or console malfunctions;
- h) Records of monitoring required by subsection (d) above shall include the time and date of the monitoring, a sketch of the area or list of points monitored, the measured dose rate at several points expressed in units, multiples or subunits of sieverts or rem per hour, the manufacturer, model and serial number of the instrument used to perform the monitoring and the identity of the individual who performed the monitoring. These records shall be retained for a period of 5 years.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.7040 Accountability of Brachytherapy Sources

- a) A licensee shall make, and retain for 5 years from the date of use, a record of the use of brachytherapy sources.
- 1) For treatments involving high dose rate afterloaders, this record shall include the time and date of treatment, the activity of the source, the name of the patient and the identity of the individual performing the treatment.
 - 2) For treatments not involving high dose rate afterloaders, this record shall include:
 - A) The number, radionuclide and activity of sources removed from storage; the time and date the sources were removed from storage; the number and activity of the sources remaining in storage after the removal; the room number where the sources were being used; the name of the patient for whom the sources were used; and the identity of the individual who removed the sources from storage; and
 - B) The number, radionuclide and activity of sources returned to storage; the time and date the sources were returned to storage; the number and activity of sources in storage after the return; the room number where the sources were used; the name of the patient for whom the sources were used; and the identity of the individual who returned the sources to storage.
- b) Except for high dose rate afterloaders, immediately after implanting sources in a patient and immediately after removal of sources from a patient the licensee shall

monitor the patient and the areas of use to confirm that no sources have been misplaced.

- c) For high dose rate afterloaders, immediately upon completion of the treatment and removal of sources from a patient, the licensee shall monitor the patient and the area of use with a portable radiation measurement survey instrument to confirm that all sources have returned to the shielded position.
- d) Except for high dose rate afterloaders, each time brachytherapy sources are returned to an area of storage from an area of use, the licensee shall immediately count the number returned to ensure that all sources taken from the storage area have been returned. If all sources are not accounted for, the licensee shall notify the Radiation Safety Officer and a search for the sources shall be started immediately. If at the conclusion of the search all sources are not accounted for, the licensee shall notify the Department in accordance with 32 Ill. Adm. Code 340.1210.
- e) A licensee shall make and retain for 5 years a record of the monitoring required by subsection (b) above. Each record shall include the monitoring date, the name of the patient, the dose rate expressed in units, multiples or subunits of sieverts or rem per hour as measured at 1 meter from the patient, the manufacturer, model and serial number of the radiation survey instrument used and the identity of the individual who performed the monitoring.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.7050 Discharge of Patients Treated With Temporary Implants

The licensee shall not authorize discharge of a patient treated by temporary implant until all sources have been removed and monitoring has been completed in accordance with Section 335.7040(b).

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

SUBPART I: TELETHERAPY

Section 335.8010 Use of a Sealed Source in a Teletherapy Unit

- a) A licensee shall use cobalt-60 or cesium-137 as a sealed source in a teletherapy unit for medical use in accordance with the manufacturer's radiation safety and operating instructions.
- b) Teletherapy sources shall be tested for leakage or contamination in accordance with Sections 335.2050(b) and (c). Tests for leakage or contamination may be made by wiping accessible surfaces of the housing port or collimator while the source is in the off position and measuring the wipes for transferred contamination.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.8020 Maintenance and Repair Restrictions

Only a person specifically licensed by the Department, the U.S. Nuclear Regulatory Commission or an Agreement State to perform teletherapy unit maintenance and repair shall install, relocate or remove a teletherapy sealed source or a teletherapy unit that contains a sealed source or maintain, adjust or repair the source drawer, the shutter or other mechanism of a teletherapy unit that could expose the source, reduce the shielding around the source or result in increased dose rates.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.8030 Amendments to Teletherapy Licenses

In addition to the requirements specified in Section 335.40, a teletherapy licensee shall apply for and shall receive a license amendment before:

- a) Making any change in the treatment room shielding;
- b) Making any change in the location of the teletherapy unit within the treatment room;
- c) Using the teletherapy unit in a manner that could result in increased dose rates in unrestricted areas or increased total effective dose equivalent to individual members of the public;
- d) Relocating the teletherapy unit; or
- e) Allowing an individual not listed on the licensee's license to perform the duties of the teletherapy physicist. If the teletherapy physicist named on the license is no longer performing his or her duties, the Radiation Safety Committee may, while an amendment is being obtained, have the duties performed for up to 90 days by an individual who is listed by name as a teletherapy physicist on a Department, U.S. Nuclear Regulatory Commission or Agreement State license and who meets the training criteria listed in Section 335.9150.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.8040 Safety Instructions for Teletherapy

- a) A licensee shall post instructions at the teletherapy unit console. To satisfy this requirement, these instructions shall inform the individual who operates the teletherapy unit of:
 - 1) The procedure to be followed to ensure that only the patient is in the treatment room before turning on the primary beam of radiation to begin a treatment or after a door interlock interruption;
 - 2) The procedure to be followed if the individual who operates the teletherapy unit is unable to turn off the primary beam of radiation with controls outside the treatment room or any other abnormal operation occurs; and
 - 3) The names and telephone numbers of the authorized users and Radiation Safety Officer who are to be contacted immediately if the teletherapy unit or console operates abnormally.
- b) A licensee shall provide instruction in the topics identified in subsection (a) above to all individuals prior to their independent operation of a teletherapy unit and shall provide refresher training to such individuals at intervals not to exceed 1 year.
- c) A licensee shall retain for 5 years a record of the names of individuals who received instruction required by subsection (b) above, a description of the instruction, the date of instruction and the identity of the individual who gave the instruction.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.8050 Doors, Interlocks and Safety Related Systems

- a) A licensee shall control access to the teletherapy room by a door at each entrance.
- b) A licensee shall equip each entrance to the teletherapy room with an electrical interlock system that shall:
 - 1) Prevent the individual who operates the teletherapy unit from turning on the primary beam of radiation unless each treatment room entrance door is closed;
 - 2) Turn off the primary beam of radiation immediately when an entrance door is opened; and

- 3) Prevent the primary beam of radiation from being turned on following an interlock interruption until all treatment room entrance doors are closed and the beam on-off control is reset at the console.
- c) A licensee shall equip each entrance to the teletherapy room with a light that indicates the beam condition.
- d) A licensee shall lock the control console in the off position if any door interlock malfunctions. The licensee shall not permit the unit to be used until the interlock system is repaired, unless specifically authorized by the Department. AGENCY NOTE: The Department might issue such authorization if necessary to continue a treatment that was initiated prior to the malfunction, provided that the licensee takes measures to compensate for the failed interlock.
- e) A licensee shall cease treatment of patients with any teletherapy unit if a safety related system of the teletherapy unit (e.g., source drive mechanisms, treatment timing systems, safety interlocks) is found inoperative. The licensee shall report to the Department any malfunction that requires the termination of patient treatment for more than 24 hours and shall submit to the Department, within 7 days, a written report of the incident and corrective actions taken.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.8060 Radiation Monitoring Device for Teletherapy

- a) A licensee shall have in each teletherapy room a permanent radiation monitor capable of continuously monitoring the status of the beam.
- b) Each radiation monitor shall be capable of providing visible indication of a teletherapy unit malfunction that results in an exposed or partially exposed source. The visible indicator of high radiation levels shall be observable by an individual entering the teletherapy room.
- c) Each radiation monitor shall be equipped with an auxiliary power supply separate from the power supply to the teletherapy unit. This auxiliary power supply may be a battery system.
- d) The radiation monitor shall be checked with a dedicated check source for proper operation each day before the teletherapy unit is used for treatment of patients. AGENCY NOTE: Exposing the teletherapy source and remotely viewing the instrument response is an acceptable method for checking the monitor with a "dedicated check source."
- e) A licensee shall maintain a record of the check required by subsection (d) above for 5 years. The record shall include the date of the check, a notation that the monitor indicated when the source was exposed and the identity of the individual who performed the check.
- f) If the radiation monitor is inoperable, the licensee shall require any individual entering the teletherapy room to use either a survey instrument or a personal dosimeter with an audible alarm to monitor for any malfunction of the source exposure mechanism that may result in an exposed or partially exposed source. The instrument or dosimeter shall be checked with a dedicated check source for proper operation at the beginning of each day of use. The licensee shall keep a record as described in subsection (e) above.
- g) If the radiation monitor is inoperable, the licensee shall take action within 24 hours to repair or replace the radiation monitor. At a minimum, such action shall include the scheduling for the repair or replacement of the inoperable monitor.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.8070 Viewing System for Teletherapy

A licensee shall construct or equip each teletherapy room to permit continuous observation of the patient from the teletherapy unit console during irradiation.

Section 335.8080 Teletherapy Dosimetry Equipment

- a) A licensee shall have a calibrated dosimetry system available for use. To satisfy this requirement, one of the following two conditions shall be met:
 - 1) The system shall have been calibrated by the National Bureau of Standards, by the National Institute of Standards and Technology or by a calibration laboratory accredited by the American Association of Physicists in Medicine (AAPM). The calibration shall have been performed within the previous 2 years and after any servicing that may have affected system calibration; or
 - 2) The system shall have been calibrated within the previous 4 years; 18 to 30 months after that calibration, the system shall have been compared with another dosimetry system that was calibrated within the past 24 months by the National Bureau of Standards, by the National Institute of Standards and Technology or by a calibration laboratory accredited by the AAPM. The dosimetry system shall be considered calibrated if a comparison is performed at a meeting sanctioned by a calibration laboratory or radiological physics center accredited by the AAPM and the results of the comparison indicate that the calibration factor of the licensee's system has not changed by more than two percent. The licensee shall not use the comparison result to change the calibration factor. When comparing dosimetry systems to be used for calibrating cobalt-60 teletherapy units, the licensee shall use a teletherapy unit with a cobalt-60 source. When comparing dosimetry systems to be used for calibrating cesium-137 teletherapy units, the licensee shall use a teletherapy unit with a cesium-137 source.
- b) The licensee shall have available for use a calibrated dosimetry system for spot-check measurements. To meet this requirement, the system may be compared with a system that has been calibrated in accordance with subsection (a) above. This comparison shall have been performed within the previous year and after each servicing that may have affected calibration of the calibrated system.
- c) The licensee shall retain a record of each calibration and comparison for the duration of the license. For each calibration or comparison, the record shall include the date, the model and serial numbers of the instruments that were calibrated or compared as required by subsections (a) and (b) above, the correction factors that were deduced, the names of the individuals who performed the calibration or comparison and evidence that the comparison meeting was sanctioned by a calibration laboratory or radiological physics center accredited by AAPM.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.8090 Full Calibration Measurements for Teletherapy

- a) A licensee authorized to use a teletherapy unit for medical use shall perform full calibration measurements as

described in subsection (b) below, on each teletherapy unit:

- 1) Before the first medical use of the unit; and
 - 2) Before medical use under the following conditions:
 - A) Whenever spot-check measurements indicate that the output differs by more than five percent from the output obtained at the last full calibration, corrected mathematically for radioactive decay;
 - B) Following replacement of the source or following reinstallation of the teletherapy unit in a new location;
 - C) Following any repair of the teletherapy unit that includes removal of the source or major repair of the components associated with the source exposure assembly; and
 - 3) At intervals not exceeding 1 year.
- b) To satisfy the requirement of subsection (a) above, full calibration measurements shall include determination of:
 - 1) The output, within three percent, for the range of field sizes and for the distance or range of distances used for medical use;
 - 2) The coincidence of the radiation field and the field indicated by the light beam localizing device;
 - 3) The uniformity of the radiation field and its dependence on the orientation of the useful beam;
 - 4) Timer constancy and linearity over the range of use;
 - 5) On-off error; and
 - 6) The accuracy of all distance measuring and localization devices in medical use.
 - c) A licensee shall use the dosimetry system described in Section 335.8080 to measure the output for one set of exposure conditions. The remaining radiation measurements required by subsection (b)(1) above may then be made using a dosimetry system that indicates relative dose rates.
 - d) A licensee shall make full calibration measurements required by subsection (a) above in accordance with either the procedures recommended by the Scientific Committee on Radiation Dosimetry of the American Association of Physicists in Medicine that are described in "Physics in Medicine and Biology" (Vol. 16, No. 3, 1971, pp. 379-396), exclusive of any subsequent amendments or editions, or by Task Group 21 of the Radiation Therapy Committee of the American Association of Physicists in Medicine that are described in "Medical Physics" (Vol. 10, No. 6, 1983, pp. 741-771 and Vol. 11, No. 2, 1984, p. 213), exclusive of any subsequent amendments or editions.
 - e) A licensee shall mathematically correct for physical decay the outputs determined in subsection (b)(1) above. These corrections shall be for intervals not exceeding 1 month for cobalt-60 and intervals not exceeding 6 months for cesium-137.
 - f) Full calibration measurements required by subsection (a) above and physical decay corrections required by subsection (e) above shall be performed by a teletherapy physicist.
 - g) A licensee shall retain a record of each calibration for the duration of the license. The record shall include the date of the calibration, the manufacturer's name, model and serial numbers for both the teletherapy unit and the source, the model and serial numbers of the instruments used to calibrate the teletherapy unit, tables that describe the output of the unit over the range of field sizes and for the range of distance used in radiation therapy, a determination of the coincidence of the radiation field and the field indicated by the light beam localizing device, an

assessment of timer constancy and linearity, the calculated on-off error, the determined accuracy of each distance measuring or localization device and the signature or initials of the teletherapy physicist.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.8100 Periodic Spot-Checks for Teletherapy

- a) A licensee authorized to use teletherapy units for medical use shall perform spot-checks on each teletherapy unit at intervals not to exceed 1 month.
- b) To satisfy the requirement of subsection (a) above, spot-checks shall include the taking of measurements that permit the determination of:
 - 1) Timer constancy and linearity over the range of use;
 - 2) On-off error;
 - 3) The coincidence of the radiation field and the field indicated by the light beam localization device;
 - 4) The accuracy of all distance measuring and localization devices used for medical use;
 - 5) The output for one typical set of operating conditions; and
 - 6) The difference between the measurement made in subsection(5) above and the anticipated output, expressed as a percentage of the anticipated value obtained at the last full calibration corrected mathematically for physical decay.
- c) A licensee shall use the dosimetry system described in Section 335.8080 to make the measurement required in subsection (b)(5) above.
- d) A licensee shall perform measurements required by subsection (a) above in accordance with written procedures established by the teletherapy physicist. The teletherapy physicist does not need to actually perform the spot-check measurements.
- e) A licensee shall have the teletherapy physicist review the results of each spot-check within 15 days. The teletherapy physicist shall, within 15 days, notify the licensee in writing of the results of each spot-check. The licensee shall keep a copy of each written notification for 5 years.
- f) A licensee authorized to use a teletherapy unit for medical use shall perform safety spot-checks of each teletherapy facility at intervals not to exceed 1 month. To satisfy this requirement, checks shall assure proper operation of:
 - 1) Electrical interlocks at each teletherapy room entrance;
 - 2) Electrical or mechanical stops installed for the purpose of limiting use of the primary beam of radiation (i.e., restriction of source housing angulation or elevation, carriage or stand travel, operation of the beam on-off mechanism);
 - 3) Beam condition indicator lights on the teletherapy unit, on the control console and in the facility;
 - 4) Viewing systems;
 - 5) Treatment room doors from inside and outside the treatment room; and
 - 6) Electrically assisted treatment room doors with the teletherapy unit electrical power turned off.
- g) A licensee shall repair or replace any system identified in subsection (f) above that is not operating properly.
- h) A licensee shall retain a record of each spot-check required by subsections (a) and (f) above for 5 years. The record shall include the date of the spot-check, the model and serial number for both the teletherapy unit and source, the model and serial number of the instrument used to measure the output of the teletherapy unit, a determination of the coincidence of the radiation field and the field

indicated by the light beam localizing device, an assessment of timer constancy and linearity, the calculated on-off error, the determined accuracy of each distance measuring or localization device, the difference between the anticipated output and the measured output, notations indicating the operability of each entrance door electrical interlock, each electrical or mechanical stop, each beam condition indicator light, the viewing system and doors and the identity of the individual who performed the periodic spot-check.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.8110 Radiation Monitoring of Teletherapy Facilities

- a) Before medical use, after each installation of a teletherapy source and after making any change for which an amendment is required by Section 335.8030(a), (b), (c) or (d), the licensee shall monitor with an operable radiation measurement survey instrument calibrated in accordance with Section 335.2020 to verify that:
 - 1) The maximum dose rate at 1 meter from the teletherapy source with the source in the off position and the collimators set for a normal treatment field does not exceed 100 microSv (10 mrem) per hour and the average dose rate for the same measurement conditions does not exceed 20 microSv (2 mrem) per hour; and
 - 2) With the teletherapy source in the on position, with the largest clinically available treatment field and with a scattering phantom in the primary beam of radiation, that:
 - A) Dose rates in restricted areas will not cause occupational doses to exceed the limits specified in 32 Ill. Adm. Code 340.210, 340.270 and 340.280; and
 - B) Dose rates in unrestricted areas and total effective dose equivalent to individual members of the public will not exceed the limits specified in 32 Ill. Adm. Code 340.310.
- b) If the results of the monitoring required by subsection (a) above indicate that any dose or dose rate will exceed the respective limit specified in that subsection, the licensee shall lock the control in the off position and not use the unit except as may be necessary to repair, replace or test the teletherapy unit, the teletherapy unit shielding or the treatment room shielding. The license may reinstate medical use of the unit when measurements indicate that the requirements of subsection (a) above have been met.
- c) A licensee shall retain a record of the radiation measurements made following installation of a teletherapy source for the duration of the license. The record shall include the date of the measurement, the reason the monitoring was performed, the manufacturer's name, model and serial number of the teletherapy unit, the teletherapy source and the instrument used to measure dose rates, each dose rate measured around the teletherapy source while in the off position and the average of all measurements, a plan of the areas surrounding the treatment room that were monitored, the measured dose rate at several points in each area expressed in units, multiples or subunits of sieverts or rem per hour, the calculated maximum doses over a period of 1 year for each restricted and unrestricted area and the signature or initials of the Radiation Safety Officer or teletherapy physicist.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.8120 Safety Checks for Teletherapy Facilities

- a) A licensee shall check all systems specified in Section 335.8100 for proper function after each installation of a teletherapy source and after making any change for which an amendment is required by Section 335.8030(b), (c) or (d). Such check shall be completed before any patient is treated.
- b) If the results of the checks required in subsection (a) above indicate the malfunction of any system specified in Section 335.8100, the licensee shall lock the control console in the off position and not use the unit except as may be necessary to repair, replace or check the malfunctioning system.
- c) A licensee shall retain, for 5 years, a record of the facility checks following installation of a source. The record shall include notations indicating the operability of each entrance door interlock, each electrical or mechanical stop, each beam condition indicator light, the viewing system, doors and the signature or initials of the Radiation Safety Officer or teletherapy physicist.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.8130 Modification of Teletherapy Unit or Room Before Beginning a Treatment Program

If the monitoring required by Section 335.8110(a)(2)(B) indicates that dose rates in an unrestricted area or total effective dose equivalent to individual members of the public may exceed the limits of 32 Ill. Adm. Code 340.310, before beginning the treatment program the licensee shall either:

- a) Undertake the following:
 - 1) Equip the unit with stops or add additional radiation shielding to ensure compliance with 32 Ill. Adm. Code 340.310;
 - 2) Perform the monitoring required by Section 335.8110 again; and
 - 3) Include in the report required by Section 335.8140 the results of the initial monitoring, a description of the modification made to comply with subsection (a)(1) above and the results of the second monitoring procedure; or
- b) Request and receive a license amendment under 32 Ill. Adm. Code 340.310(b) that authorizes a total effective dose equivalent to individual members of the public that is greater than that permitted by 32 Ill. Adm. Code 340.310(a)(2)(B).

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.8140 Reports of Teletherapy Monitoring, Checks, Tests and Measurements

A licensee shall submit a copy of the records required by Sections 335.8110, 335.8120, 335.8130 and the output from the teletherapy source within 30 days following completion of the action that caused a record to be required. The output shall be expressed as coulombs per kilogram, roentgens, grays or rad per hour, at either 1 meter or the usual treatment distance from the source and determined during the full calibration required by Section 335.8090. The record shall be sent to the Department of Nuclear Safety, Office of Radiation Safety, 1035 Outer Park Drive, Springfield, IL 62704.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.8150 5-Year Teletherapy Inspection

- a) A licensee shall have each teletherapy unit fully inspected and serviced during teletherapy source replacement or at intervals not to exceed 5 years, whichever comes first, to assure proper functioning of the source exposure mechanism.
- b) This inspection and servicing shall only be performed by persons specifically licensed to do so by the Department, the U.S. Nuclear Regulatory Commission or an Agreement State.
- c) A licensee shall keep a record of the inspection and servicing for the duration of the license. The record shall contain the inspector's name, the inspector's license number, the date of inspection, the manufacturer's name, model and serial number for both the teletherapy unit and source, a list of components inspected, a list of components serviced and the type of service, a list of components replaced and the signature or initials of the inspector.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

SUBPART J: TRAINING AND EXPERIENCE REQUIREMENTS**Section 335.9010 Radiation Safety Officer**

Except as provided in Section 335.9020, an individual fulfilling the responsibilities of the Radiation Safety Officer as provided in Section 335.1020 shall:

- a) Be certified by either:
 - 1) American Board of Health Physics in Comprehensive Health Physics; or
 - 2) American Board of Radiology in Radiological Physics, Therapeutic Radiological Physics or Medical Nuclear Physics; or
 - 3) American Board of Nuclear Medicine; or
 - 4) American Board of Science in Nuclear Medicine; or
 - 5) Board of Pharmaceutical Specialties in Nuclear Pharmacy or Science; or
 - 6) American Board of Medical Physics in Radiation Oncology Physics; or
 - 7) Royal College of Physicians and Surgeons of Canada in Nuclear Medicine; or
- b) Hold a master's degree or doctorate degree in physics, biophysics, radiological sciences, radiological physics or health physics and have 6 months of full-time work experience under the supervision of a Radiation Safety Officer at a medical institution; or
- c) Have had:
 - 1) 200 hours of classroom and laboratory training as follows:
 - A) Radiation physics and instrumentation;
 - B) Radiation protection;
 - C) Mathematics pertaining to the use and measurement of radioactivity;
 - D) Radiation biology;
 - E) Radiopharmaceutical chemistry; and
 - 2) 1 year of full-time experience in radiation safety at a medical institution under the supervision of the individual identified as the Radiation Safety Officer on a Department, U.S. Nuclear Regulatory Commission, Agreement State or Licensing State license that authorizes the medical use of radioactive material; or
- d) Be an authorized user for those radioactive material uses that come within the Radiation Safety Officer's responsibilities.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9020 Training for Experienced Radiation Safety Officer

An individual identified as a Radiation Safety Officer on a Department, U.S. Nuclear Regulatory Commission, Agreement State or Licensing State license on July 15, 1991 who oversees only the use of radioactive material for which the licensee was authorized on that date need not comply with the training requirements of Section 335.9010.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9030 Training for Uptake, Dilution or Excretion Studies

Except as provided in Section 335.9160 or 335.9170, a licensee shall require the authorized user of a radiopharmaceutical specified in Section 335.3010 to be a physician who:

- a) Is certified in:
 - 1) Nuclear medicine by the American Board of Nuclear Medicine; or
 - 2) Nuclear medicine by the American Board of Osteopathic Nuclear Medicine; or
 - 3) Diagnostic radiology by the American Board of Radiology; or
 - 4) Diagnostic radiology or radiology by the American Osteopathic Board of Radiology; or
 - 5) Nuclear medicine by the Royal College of Physicians and Surgeons of Canada; or
- b) Has completed 40 hours of instruction in basic radionuclide handling techniques applicable to the use of prepared radiopharmaceuticals and 20 hours of supervised clinical experience.
 - 1) To satisfy the basic instruction requirement, 40 hours of classroom and laboratory instruction shall include:
 - A) Radiation physics and instrumentation;
 - B) Radiation protection;
 - C) Mathematics pertaining to the use and measurement of radioactivity;
 - D) Radiation biology; and
 - E) Radiopharmaceutical chemistry.
 - 2) To satisfy the requirement for 20 hours of supervised clinical experience, training shall be under the supervision of an authorized user at a medical institution and shall include:
 - A) Examining patients and reviewing their case histories to determine their suitability for radionuclide diagnosis and to gain experience with the limitations and contraindications of the studies;
 - B) Selecting the suitable radiopharmaceuticals and calculating and measuring the dosages;
 - C) Administering dosages to patients and using syringe radiation shields;
 - D) Collaborating with the authorized user in the interpretation of radionuclide test results; and
 - E) Patient follow-up; or
- c) Has successfully completed a 6-month training program in nuclear medicine as part of a training program that has been approved by the Accreditation Council for Graduate Medical Education and that included classroom and laboratory training, work experience and supervised clinical experience in all the topics identified in subsection (b) above.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9040 Training for Imaging and Localization Studies

Except as provided in Section 335.9160 or 335.9170, a licensee shall require the authorized user of a radiopharmaceutical, generator or reagent kit specified in Section 335.4010 to be a physician who:

- a) Is certified in:
 - 1) Nuclear medicine by the American Board of Nuclear Medicine; or
 - 2) Nuclear medicine by the American Board of Osteopathic Nuclear Medicine; or
 - 3) Diagnostic radiology by the American Board of Radiology; or
 - 4) Diagnostic radiology or radiology by the American Osteopathic Board of Radiology; or
 - 5) Nuclear medicine by the Royal College of Physicians and Surgeons of Canada; or
- b) Has completed 200 hours of instruction in basic radionuclide handling techniques applicable to the use of prepared radiopharmaceuticals, generators and reagent kits, 500 hours of supervised work experience and 500 hours of supervised clinical experience.
 - 1) To satisfy the basic instruction requirement, 200 hours of classroom and laboratory training shall include:
 - A) Radiation physics and instrumentation;
 - B) Radiation protection;
 - C) Mathematics pertaining to the use and measurement of radioactivity;
 - D) Radiopharmaceutical chemistry; and
 - E) Radiation biology.
 - 2) To satisfy the requirement for 500 hours of supervised work experience, training shall be under the supervision of an authorized user at a medical institution and shall include:
 - A) Ordering, receiving and unpacking radioactive materials safely and performing the related radiation monitoring;
 - B) Calibrating dose calibrators and diagnostic instruments and performing checks for proper operation of survey instruments;
 - C) Calculating and safely preparing patient dosages;
 - D) Using administrative controls to prevent the misadministration of radioactive material;
 - E) Using emergency procedures to contain spilled radioactive material safely and using proper decontamination procedures; and
 - F) Eluting technetium-99m from generator systems, assaying and testing the eluate for molybdenum-99 and alumina contamination and processing the eluate with reagent kits to prepare technetium-99m labeled radiopharmaceuticals.
 - 3) To satisfy the requirement for 500 hours of supervised clinical experience, training shall be under the supervision of an authorized user at a medical institution and shall include:
 - A) Examining patients and reviewing their case histories to determine their suitability for radionuclide diagnosis and to gain experience with the limitations and contraindications of the studies;
 - B) Selecting the suitable radiopharmaceuticals and calculating and measuring the dosages;
 - C) Administering dosages to patients and using syringe radiation shields;

- D) Collaborating with the authorized user in the interpretation of radionuclide test results; and
- E) Patient follow-up; or
- c) Has successfully completed a 6-month training program in nuclear medicine that has been approved by the Accreditation Council for Graduate Medical Education and that included classroom and laboratory training, work experience and supervised clinical experience in all the topics identified in subsection (b) above.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9050 Training for Therapeutic Use of Radiopharmaceuticals

Except as provided in Section 335.9160, a licensee shall require the authorized user of a radiopharmaceutical specified in Section 335.5010 for therapy to be a physician who:

- a) Is certified by:
 - 1) The American Board of Nuclear Medicine; or
 - 2) The American Board of Radiology in radiology, therapeutic radiology or radiation oncology; or
- b) Has completed 80 hours of instruction in basic radionuclide handling techniques applicable to the use of therapeutic radiopharmaceuticals and has had supervised clinical experience.
 - 1) To satisfy the requirement for instruction, 80 hours of classroom and laboratory training shall include:
 - A) Radiation physics and instrumentation;
 - B) Radiation protection;
 - C) Mathematics pertaining to the use and measurement of radioactivity; and
 - D) Radiation biology;
 - 2) To satisfy the requirement for supervised clinical experience, training shall be under the supervision of an authorized user at a medical institution and shall include:
 - A) Use of iodine-131 for diagnosis of thyroid function and the treatment of hyperthyroidism or cardiac dysfunction in ten individuals; and
 - B) Use of iodine-131 for treatment of thyroid carcinoma in three individuals.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9060 Training for Treatment of Hyperthyroidism

Except as provided in Section 335.9160, the licensee shall require the authorized user of only iodine-131 for the treatment of hyperthyroidism to be a physician with experience in the diagnosis and treatment of thyroid disease, who has had classroom and laboratory training in basic radionuclide handling techniques applicable to the use of iodine-131 for treatment of hyperthyroidism and supervised clinical experience as follows:

- a) 80 hours of classroom and laboratory training that includes:
 - 1) Radiation physics and instrumentation;
 - 2) Radiation protection;
 - 3) Mathematics pertaining to the use and measurement of radioactivity;
 - 4) Radiation biology; and
- b) Supervised clinical experience under the supervision of an authorized user that includes the use of iodine-131 for diagnosis of thyroid function and the treatment of hyperthyroidism in ten individuals.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9070 Training for Treatment of Thyroid Carcinoma

Except as provided in Section 335.9160, the licensee shall require the authorized user of only iodine-131 for the treatment of thyroid carcinoma to be a physician with experience in the diagnosis and treatment of thyroid disease who has had classroom and laboratory training in basic radionuclide handling techniques applicable to the use of iodine-131 for treatment of thyroid carcinoma and supervised clinical experience as follows:

- a) 80 hours of classroom and laboratory training that includes:
 - 1) Radiation physics and instrumentation;
 - 2) Radiation protection;
 - 3) Mathematics pertaining to the use and measurement of radioactivity;
 - 4) Radiation biology; and
- b) Supervised clinical experience under the supervision of an authorized user that includes the use of iodine-131 for the treatment of thyroid carcinoma in three individuals.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9080 Training for Therapeutic Use of Soluble Phosphorus-32

Except as provided in Section 335.9160, the licensee shall require the authorized user of only soluble phosphorus-32 for therapy to be a physician who has had classroom and laboratory training in basic radionuclide handling techniques applicable to the use of soluble phosphorus-32 for therapy and supervised clinical experience as follows:

- a) 80 hours of classroom and laboratory training that includes:
 - 1) Radiation physics and instrumentation;
 - 2) Radiation protection;
 - 3) Mathematics pertaining to the use and measurement of radioactivity;
 - 4) Radiation biology; and
- b) Use of soluble phosphorus-32 for therapy, such as the treatment of ascites, polycythemia vera, leukemia or bone metastasis, in three individuals.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9090 Training for Therapeutic Use of Colloidal Chromic Phosphorus-32 Labeled Phosphate Compound or Gold-198

Except as provided in Section 335.9160, the licensee shall require the authorized user of only colloidal chromic phosphorus-32 labeled phosphate compound or of colloidal gold-198 for therapy to be a physician who has had classroom and laboratory training in basic radionuclide handling techniques applicable to the use of colloidal chromic phosphorus-32 labeled phosphate compound or of colloidal gold-198 for therapy and supervised clinical experience as follows:

- a) 80 hours of classroom and laboratory training that includes:
 - 1) Radiation physics and instrumentation;
 - 2) Radiation protection;
 - 3) Mathematics pertaining to the use and measurement of radioactivity;
 - 4) Radiation biology; and
- b) Use of colloidal chromic phosphorus-32 labeled phosphate compound or of colloidal gold-198 for therapy, such as intracavitary treatment of malignant effusions, in three individuals.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9100 Training for Use of Sources for Brachytherapy

Except as provided in Section 335.9160, the licensee shall require the authorized user performing brachytherapy in accordance with Section 335.7010 to be a physician who:

- a) Is certified in:
 - 1) Radiology, therapeutic radiology or radiation oncology by the American Board of Radiology; or
 - 2) Radiation oncology by the American Osteopathic Board of Radiology; or
 - 3) Radiology, with a specialization in radiation therapy, as a British "Fellow of the Faculty of Radiology" or "Fellow of the Royal College of Radiology"; or
 - 4) Therapeutic radiology by the Canadian Royal College of Physicians and Surgeons; or
- b) Is in the practice of therapeutic radiology, has completed 200 hours of instruction in basic radionuclide handling techniques applicable to the therapeutic use of brachytherapy sources and 500 hours of supervised work experience and a minimum of 3 years of supervised clinical experience.
 - 1) To satisfy the requirement for instruction, 200 hours of classroom and laboratory training shall include:
 - A) Radiation physics and instrumentation;
 - B) Radiation protection;
 - C) Mathematics pertaining to the use and measurement of radioactivity; and
 - D) Radiation biology.
 - 2) To satisfy the requirement for 500 hours of supervised work experience, training shall be under the supervision of an authorized user at an institution and shall include:
 - A) Ordering, receiving and unpacking radioactive materials safely and performing the related radiation monitoring;
 - B) Performing checks for proper operations of survey instruments;
 - C) Preparing, implanting and removing sealed sources;
 - D) Maintaining inventories and accountability of radioactive material possessed;
 - E) Using administrative controls to prevent the misadministration of radioactive material; and
 - F) Using emergency procedures to control radioactive material.
 - 3) To satisfy the requirement for a period of supervised clinical experience, training shall include 1 year in a training program approved by the Residency Review Committee for Radiology of the Accreditation Council for Graduate Medical Education or the Committee on Postdoctoral Training of the American Osteopathic Association and an additional 2 years of clinical experience in therapeutic radiology under the supervision of an authorized user at a medical institution. The supervised clinical experience shall include:
 - A) Examining individuals and reviewing their case histories to determine their suitability for brachytherapy treatment and to gain experience with the limitations and contraindications of brachytherapy;
 - B) Selecting the proper brachytherapy sources, dose and method of administration;
 - C) Calculating the dose; and

- D) Post-administration follow-up and review of case histories in collaboration with an authorized user.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9120 Training for Ophthalmic Use of Strontium-90

Except as provided in Section 335.9160, the licensee shall require the authorized user using only strontium-90 for ophthalmic radiation therapy to be a physician who:

- a) Is certified in radiology or therapeutic radiology by the American Board of Radiology; or
- b) Is in the practice of therapeutic radiology or ophthalmology, and has completed 24 hours of instruction in basic radionuclide handling techniques applicable to the use of strontium-90 for ophthalmic radiation therapy and supervised clinical training in ophthalmic radiation therapy.
 - 1) To satisfy the requirement for instruction, the classroom and laboratory training shall include:
 - A) Radiation physics and instrumentation;
 - B) Radiation protection;
 - C) Mathematics pertaining to the use and measurement of radioactivity; and
 - D) Radiation biology.
 - 2) To satisfy the requirement for supervised clinical training in ophthalmic radiation therapy, training shall be under the supervision of an authorized user at a medical institution and shall include the use of strontium-90 for the ophthalmic treatment of five individuals that includes:
 - A) Examination of each individual to be treated;
 - B) Calculation of the dose to be administered;
 - C) Administration of the dose; and
 - D) Follow-up and review of each individual's case history.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9130 Training for Use of Sealed Sources for Diagnosis

Except as provided in Section 335.9160, the licensee shall require the authorized user using a sealed source in a device specified in Section 335.6010 to be a physician, dentist or podiatrist who:

- a) Is certified in:
 - 1) Radiology, diagnostic radiology, therapeutic radiology or radiation oncology by the American Board of Radiology; or
 - 2) Nuclear medicine by the American Board of Nuclear Medicine; or
 - 3) Diagnostic radiology or radiology by the American Osteopathic Board of Radiology; or
 - 4) Nuclear medicine by the Royal College of Physicians and Surgeons of Canada; or
- b) Has completed 8 hours of instruction in basic radionuclide handling techniques specifically applicable to the use of the device. To satisfy the requirement for instruction, the training shall include:
 - 1) Radiation physics, mathematics pertaining to the use and measurement of radioactivity and instrumentation;
 - 2) Radiation biology; and
 - 3) Radiation protection and training in the use of the device for the purpose authorized by the license.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9140 Training for Teletherapy

Except as provided in Section 335.9160, the licensee shall require the authorized user of a sealed source specified in Section 335.8010 in a teletherapy unit to be a physician who:

- a) Is certified in:
 - 1) Radiology, therapeutic radiology or radiation oncology by the American Board of Radiology; or
 - 2) Radiation oncology by the American Osteopathic Board of Radiology; or
 - 3) Radiology, with specialization in radiation therapy, as a British "Fellow of the Faculty of Radiology" or "Fellow of the Royal College of Radiology"; or
 - 4) Therapeutic radiology by the Royal College of Physicians and Surgeons of Canada; or
- b) Is in the practice of therapeutic radiology and has completed 200 hours of instruction in basic radionuclide techniques applicable to the use of a sealed source in a teletherapy unit, 500 hours of supervised work experience and a minimum of 3 years of supervised clinical experience.
 - 1) To satisfy the requirement for instruction, the classroom and laboratory training shall include:
 - A) Radiation physics and instrumentation;
 - B) Radiation protection;
 - C) Mathematics pertaining to the use and measurement of radioactivity; and
 - D) Radiation biology.
 - 2) To satisfy the requirement for supervised work experience, training shall be under the supervision of an authorized user at an institution and shall include:
 - A) Review of the full calibration measurements and periodic spot-checks;
 - B) Preparing treatment plans and calculating treatment times;
 - C) Using administrative controls to prevent misadministrations;
 - D) Implementing emergency procedures to be followed in the event of the abnormal operation of a teletherapy unit or console; and
 - E) Performing checks for proper operation of survey instruments.
 - 3) To satisfy the requirement for a period of supervised clinical experience, training shall include 1 year in a training program approved by the Residency Review Committee for Radiology of the Accreditation Council for Graduate Medical Education or the Committee on Postdoctoral Training of the American Osteopathic Association and an additional 2 years of clinical experience in therapeutic radiology under the supervision of an authorized user at a medical institution. The supervised clinical experience shall include:
 - A) Examining individuals and reviewing their case histories to determine their suitability for teletherapy treatment and to gain experience with the limitations and contraindications of teletherapy;
 - B) Selecting the proper dose and how it is to be administered;
 - C) Calculating the teletherapy doses and collaborating with the authorized user in the review of patients' progress and consideration of the need to modify originally prescribed doses as warranted by patients' reaction to radiation; and

- D) Post-administration follow-up and review of case histories.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9150 Training for Teletherapy Physicist

The licensee shall require the teletherapy physicist to:

- a) Be certified by the American Board of Radiology in:
 - 1) Therapeutic radiological physics; or
 - 2) Roentgen ray and gamma ray physics; or
 - 3) X-ray and radium physics; or
 - 4) Radiological physics; or
- b) Be certified by the American Board of Medical Physics in radiation oncology physics; or
- c) Hold a master's degree or doctorate in physics, biophysics, radiological physics, or health physics and have completed 1 year of full-time training in therapeutic radiological physics and also 1 year of full-time work experience under the supervision of a teletherapy physicist at a medical institution. To meet this requirement, the individual shall have performed the tasks specified in Sections 335.2070, 335.9020, 335.9030 and 335.9040 under the supervision of a teletherapy physicist during the year of work experience.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9160 Training for Experienced Authorized Users

Practitioners of the healing arts identified as authorized users for the human use of radioactive material on a Department, U.S. Nuclear Regulatory Commission, Agreement State or Licensing State license on July 15, 1991, and who perform only those methods of use for which they were authorized on that date, need not comply with the training requirements of Sections 335.9010 through 335.9180.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9170 Physician Training in a 3-Month Program

A physician who, before July 1, 1984, began a 3-month nuclear medicine training program approved by the Accreditation Council for Graduate Medical Education and who has successfully completed the program is exempted from the requirements of Sections 335.9030 or 335.9040.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9180 Recentness of Training

The training and experience specified in Sections 335.9010 through 335.9150 shall have been obtained within the 5 years preceding the date of application or the individual shall have had related continuing education and experience in the items listed in the applicable section since the required training and experience was completed.

AGENCY NOTE: Individuals specifically listed on an active Department, U.S. Nuclear Regulatory Commission, Agreement State or Licensing State license as an authorized user, Radiation Safety Officer or teletherapy physicist are considered to have met the recentness of training requirements for only those procedures for which they were authorized.

(Source: Amended at 18 Ill. Reg. 7308, effective May 2, 1994)

Section 335.9190 Resolution of Conflicting Requirements During Transition Period

If the rules in this Part conflict with the licensee's radiation safety program as identified in its license, this Part shall apply, unless the statements, representations, conditions and procedures in the license are more restrictive. However, if that licensee exercises its privilege to amend its license, the portion amended must comply with the requirements of this Part.

TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

PART 340
STANDARDS FOR PROTECTION AGAINST
RADIATION

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340.20	Scope
340.25	Incorporations by Reference
340.30	Definitions
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- 340.1230 Reports of Exposures, Radiation Levels and Concentrations of Radioactive Material Exceeding the Limits
- 340.1240 Reports of Planned Special Exposures
- 340.1250 Notifications and Reports to Individuals
- 340.1260 Reports of Leaking or Contaminated Sealed Sources
- 340.1270 Reports of Missing Waste Shipments

(May 21, 1991). Corrections were published at 56 FR 61352 - 61353 (December 3, 1991) and an amendment was published at 57 FR 57877 - 57879 (December 8, 1992). The incorporation includes the 1991 correction and the 1992 amendment.

Section 340.30 Definitions

As used in this Part:

SUBPART N: ADDITIONAL REQUIREMENTS**Section**

- 340.1310 Vacating Premises
 - 340.1320 Removal of Radioactive Contamination
- APPENDIX A Decontamination Guidelines
ILLUSTRATION A Radiation Symbol

AUTHORITY: Implementing and authorized by Section 16 of the Radiation Protection Act of 1990 420 ILCS 40/16 .

SOURCE: Filed April 24, 1970 by the Department of Public Health; transferred to the Department of Nuclear Safety by P.A. 81-1516, effective December 3, 1980; amended at 5 Ill. Reg. 9586, effective September 10, 1981; codified at 7 Ill. Reg. 16027; Recodified at 10 Ill. Reg. 11273; amended at 10 Ill. Reg. 17538, effective September 25, 1986; amended at 16 Ill. Reg. 11538, effective July 7, 1992; old Part repealed, new Part adopted at 17 Ill. Reg. 18507, effective January 1, 1994; amended at 19 Ill. Reg. 8264, effective June 12, 1995.

Section 340.10 Purpose

- a) This Part establishes standards for protection against ionizing radiation resulting from activities conducted pursuant to licenses or registrations issued by the Department. This Part is issued pursuant to the Radiation Protection Act of 1990 (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 210-1 et seq.) 420 ILCS 40 .
- b) The requirements of this Part are designed to control the receipt, possession, use, transfer, and disposal of sources of radiation by any licensee or registrant so that the total dose to an individual, including doses resulting from all sources of radiation other than background radiation, does not exceed the standards for protection against radiation prescribed in this Part. However, nothing in this Part shall be construed as limiting actions that may be necessary to protect health and safety in an emergency.

Section 340.20 Scope

Except as specifically provided in other regulations of the Department, this Part applies to persons licensed or registered by the Department to receive, possess, use, transfer or dispose of sources of radiation pursuant to 32 Ill. Adm. Code: Chapter II, Subchapters b and d. The limits in this Part do not apply to doses due to background radiation, to exposure of patients to radiation for the purpose of medical diagnosis or therapy, or to voluntary participation in medical research programs.

Section 340.25 Incorporations by Reference

All rules, standards and guidelines of agencies of the United States or nationally recognized organizations or associations that are incorporated by reference in this Part are incorporated as of the date specified in the reference and do not include any later amendments or editions. Copies of these rules, standards and guidelines that have been incorporated by reference are available for public inspection at the Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, Illinois.

AGENCY NOTE: In this Part, the Department has incorporated by reference the appendices to 10 CFR 20, effective as of January 1, 1994. These appendices were originally published at 56 FR 23360 - 23474

"Annual limit on intake" (ALI) means the derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year by the reference man that would result in a committed effective dose equivalent of 0.05 Sv (5 rem) or a committed dose equivalent of 0.5 Sv (50 rem) to any individual organ or tissue. ALI values for intake by ingestion and by inhalation of selected radionuclides are given in Table 1, Columns 1 and 2 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions.

"Class" (lung class or inhalation class) means a classification scheme for inhaled material according to its rate of clearance from the pulmonary region of the lung. Materials are classified as D, W or Y, which applies to a range of clearance half-times: for Class D (Days) of less than 10 days, for Class W (Weeks) from 10 to 100 days, and for Class Y (Years) of greater than 100 days.

"Derived air concentration" (DAC) means the concentration of a given radionuclide in air which, if breathed by the reference man for a working year of 2,000 hours under conditions of light work would result in an intake of one ALI. For purposes of this definition, the condition of light work is an inhalation rate of 1.2 cubic meters of air per hour for 2,000 hours in a year. DAC values are given in Table 1, Column 3 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions.

"Derived air concentration-hour" (DAC-hour) means the product of the concentration of radioactive material in air (expressed as a fraction or multiple of the derived air concentration for each radionuclide) and the time of exposure to that radionuclide (expressed in hours). A licensee may take 2,000 DAC-hours to represent one ALI, equivalent to a committed effective dose equivalent of 0.05 Sv (5 rem).

"Inhalation class" (see "Class").

"Lung class" (see "Class").

"Nonstochastic effect" (deterministic effect) means a health effect, the severity of which varies with the dose and for which a threshold is believed to exist. Radiation-induced cataract formation is an example of a nonstochastic effect.

"Planned special exposure" means an infrequent exposure to radiation, the dose from which is separate from and in addition to the annual occupational dose limits.

"Reference Man" means a hypothetical aggregation of human physical and physiological characteristics determined by international consensus. These characteristics may be used by researchers and public

health workers to standardize results of experiments and to relate biological insult to a common base.

AGENCY NOTE: A description of the Reference Man is contained in the International Commission on Radiological Protection report, ICRP Publication 23, "Report of the Task Group on Reference Man."

"Respiratory protective equipment" means an apparatus, such as a respirator, used to reduce an individual's intake of airborne radioactive materials.

"Sanitary sewerage" means a system of public sewers for carrying off waste water and refuse, but excluding sewage treatment facilities, septic tanks, and leach fields owned or operated by the licensee.

"Stochastic effect" (probabilistic effect) means a health effect that occurs randomly and for which the probability of the effect occurring, rather than its severity, is assumed to be a linear function of dose without threshold. Hereditary effects and cancer incidence are examples of stochastic effects.

"Weighting factor" (w_T), means the proportion of the risk of stochastic effects resulting from irradiation of an organ or tissue (T) to the total risk of stochastic effects when the whole body is irradiated uniformly. For calculating the effective dose equivalent, the values of (w_T) are:

Organ or
Tissue (w_T)

Gonads	0.25
Breast	0.15
Red bone marrow	0.12
Lung	0.12
Thyroid	0.03
Bone surfaces	0.03
Remainder	0.30(a)

Whole Body 1.00(b)

(a) 0.30 results from 0.06 for each of 5 "remainder" organs, excluding the skin and the lens of the eye, that receive the highest doses.

(b) For the purpose of weighting the external whole-body dose, for adding it to the internal dose, a single weighting factor, (w_T) = 1.0, has been specified.

Section 340.40 Implementation

- Any existing license condition that is more restrictive than this Part remains in force until there is an amendment or renewal of the license.
- If a license condition exempts a licensee from a provision of this Part in effect before January 1, 1994, it also exempts the licensee from the corresponding provision of this Part, as revised effective January 1, 1994, until there is an amendment or renewal of the license that modifies or removes the condition.
- If a license condition cites provisions of this Part in effect before January 1, 1994, which do not correspond to any provisions of this Part, as revised effective January 1, 1994, the license condition remains in force until there is

an amendment or renewal of the license that modifies or removes the condition.

SUBPART B: RADIATION PROTECTION PROGRAMS

Section 340.110 Radiation Protection Programs

- Each licensee or registrant shall develop, document and implement a radiation protection program that ensures compliance with the provisions of this Part. (See Section 340.1120 for recordkeeping requirements relating to these programs.)
- The licensee or registrant shall use, to the extent practicable, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and public doses that are as low as is reasonably achievable (ALARA).
- The licensee shall review, at intervals not to exceed 12 months, the radiation protection program content and implementation.
- The registrant shall review, at intervals not to exceed 1 inspection cycle as specified in 32 Ill. Adm. Code 410.60(d), the radiation protection program content and implementation.

SUBPART C: OCCUPATIONAL DOSE LIMITS

Section 340.210 Occupational Dose Limits for Adults

- The licensee or registrant shall control the occupational dose to individual adults, except for planned special exposures pursuant to Section 340.260, to the following dose limits:
 - An annual limit, which is the more limiting of:
 - The total effective dose equivalent being equal to 0.05 Sv (5 rem); or
 - The sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 0.5 Sv (50 rem).
 - The annual limits to the lens of the eye, to the skin and to the extremities which are:
 - An eye dose equivalent of 0.15 Sv (15 rem), and
 - A shallow dose equivalent of 0.5 Sv (50 rem) to the skin or to any extremity.
- Doses received in excess of the annual limits, including doses received during accidents, emergencies and planned special exposures, shall be subtracted from the limits for planned special exposures that the individual may receive during the current year and during the individual's lifetime (see Section 340.260(e)).
- The assigned deep dose equivalent and shallow dose equivalent shall be for the portion of the body receiving the highest exposure.
- The deep dose equivalent, eye dose equivalent and shallow dose equivalent may be assessed from surveys or other radiation measurements for the purpose of demonstrating compliance with the occupational dose limits, if the individual monitoring device was not in the region of highest potential exposure, or the results of individual monitoring are unavailable.
- Derived air concentration (DAC) and annual limit on intake (ALI) values are specified in Table 1 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions, and may

be used to determine the individual's dose (see Section 340.1160) and to demonstrate compliance with the occupational dose limits.

- f) Notwithstanding the annual dose limits, the licensee shall limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity (see footnote 3 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions.)
- g) The licensee or registrant shall reduce the dose that an individual may be allowed to receive in the current year by the amount of occupational dose received while employed by any other person during the current year (see Section 340.250(a) and (d)).

AGENCY NOTE: The purpose of this requirement is to ensure that no individual receives an annual occupational dose in excess of the occupational dose limits set forth in this Section.

Section 340.220 Compliance with Requirements for Summation of External and Internal Doses

- a) General Requirement. If the licensee is required to monitor individual occupational dose pursuant to both Section 340.520(a) and (b), the licensee shall demonstrate compliance with the dose limits by summing external and internal doses. If the licensee or registrant is required to monitor individual occupational dose only pursuant to Section 340.520(a) or only pursuant to Section 340.520(b), then summation is not required to demonstrate compliance with the dose limits. The licensee may demonstrate compliance with the requirements for summation of external and internal doses pursuant to subsections (b), (c) and (d) below. The dose equivalents for the lens of the eye, the skin, and the extremities are not included in the summation, but are subject to separate limits.
- b) Intake by Inhalation. If the only intake of radionuclides is by inhalation, the total effective dose equivalent limit is not exceeded if the sum of the deep dose equivalent divided by the total effective dose equivalent limit, and one of the following, does not exceed unity:
 - 1) The sum of the fractions of the inhalation ALI for each radionuclide; or
 - 2) The total number of derived air concentration-hours (DAC-hours) for all radionuclides divided by 2,000; or
 - 3) The sum of the calculated committed effective dose equivalents to all significantly irradiated organs or tissues (T) calculated from bioassay data using biological models and expressed as a fraction of the annual limit. For purposes of this requirement, an organ or tissue is deemed to be significantly irradiated if, for that organ or tissue, the product of the weighting factor (W_T) and the committed dose equivalent, $H_T,50$, per unit intake is greater than ten percent of the maximum weighted value of $H_T,50$ (i.e., $W_T H_T,50$) per unit intake for any organ or tissue.
- c) Intake by Oral Ingestion. If the occupationally exposed individual receives an intake of radionuclides by oral ingestion greater than ten percent of the applicable oral ALI, the licensee shall account for this intake and include it in demonstrating compliance with the limits.
- d) Intake Through Wounds or Absorption Through Skin. The licensee shall evaluate and, to the extent practicable, account for intakes through wounds or skin absorption. The intake through intact skin has been included in the calculation of DAC for hydrogen-3 and does not need to

be further evaluated or accounted for pursuant to this subsection.

Section 340.230 Determination of External Dose from Airborne Radioactive Material

- a) Licensees shall, when determining the dose from airborne radioactive material, include the contribution to the deep dose equivalent, eye dose equivalent and shallow dose equivalent from external exposure to the radioactive cloud (see footnotes 1 and 2 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions).
- b) Airborne radioactivity measurements and DAC values shall not be used as the primary means to assess the deep dose equivalent when the airborne radioactive material includes radionuclides other than noble gases or if the cloud of airborne radioactive material is not relatively uniform. The determination of the deep dose equivalent to an individual shall be based upon measurements using instruments or individual monitoring devices.

Section 340.240 Determination of Internal Exposure

- a) For purposes of assessing dose used to determine compliance with occupational dose equivalent limits, the licensee shall, when required pursuant to Section 340.520, take measurements of:
 - 1) Concentrations of radioactive materials in air in work areas during conditions of operations; or
 - 2) Quantities of radionuclides in the body after exposure to materials that could result in an intake; or
 - 3) Quantities of radionuclides excreted from the body after exposure to materials that could result in an intake; or
 - 4) Combinations of these measurements.
- b) Unless respiratory protective equipment is used, as provided in Section 340.730, or the assessment of intake is based on bioassays, the licensee shall assume that an individual inhales radioactive material at the airborne concentration in which the individual is present.
- c) When specific information on the physical and biochemical properties of the radionuclides taken into the body or the behavior of the material in an individual is known, the licensee may:
 - 1) Use that information to calculate the committed effective dose equivalent, and if used, the licensee shall document that information in the individual's record; and
 - 2) Upon prior approval of the Department, adjust the DAC or ALI values to reflect the actual physical and chemical characteristics of airborne radioactive material (e.g., aerosol size distribution or density); and
 - 3) Separately assess the contribution of fractional intakes of Class D, W or Y compounds of a given radionuclide (see Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions, to the committed effective dose equivalent).
- d) If the licensee chooses to assess intakes of Class Y material using the measurements specified in subsections (a)(2) or (3) above, the licensee may delay the recording and reporting of the assessments for periods up to 7 months, unless otherwise required by Sections 340.1220 or 340.1230.

AGENCY NOTE: This delay permits the licensee to make additional measurements basic to the assessments.

- e) If the identity and concentration of each radionuclide in a mixture are known, the fraction of the DAC applicable to the mixture for use in calculating DAC-hours shall be either:
 - 1) The sum of the ratios of the concentration to the appropriate DAC value (e.g., D, W or Y) from Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions, for each radionuclide in the mixture; or
 - 2) The ratio of the total concentration for all radionuclides in the mixture to the most restrictive DAC value for any radionuclide in the mixture.
- f) If the identity of each radionuclide in a mixture is known, but the concentration of one or more of the radionuclides in the mixture is not known, the DAC for the mixture shall be the most restrictive DAC of any radionuclide in the mixture.
- g) When a mixture of radionuclides in air exists, a licensee may disregard certain radionuclides in the mixture if:
 - 1) The licensee uses the total activity of the mixture in demonstrating compliance with the dose limits in Section 340.210 and in complying with the monitoring requirements in Section 340.520(b);
 - 2) The concentration of any radionuclide disregarded is less than ten percent of its DAC; and
 - 3) The sum of these percentages for all of the radionuclides disregarded in the mixture does not exceed 30 percent.
- h) When determining the committed effective dose equivalent, the following information may be considered:
 - 1) In order to calculate the committed effective dose equivalent, the licensee may assume that the inhalation of one ALI, or an exposure of 2,000 DAC-hours, results in a committed effective dose equivalent of 0.05 Sv (5 rem) for radionuclides that have their ALIs or DACs based on the committed effective dose equivalent.
 - 2) For an ALI (and the associated DAC) determined by the nonstochastic organ dose limit of 0.5 Sv (50 rem), the intake of radionuclides that would result in a committed effective dose equivalent of 0.05 Sv (5 rem) (the stochastic ALI) is listed in parentheses in Table 1 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions. The licensee may, as a simplifying assumption, use the stochastic ALI to determine committed effective dose equivalent. However, if the licensee uses the stochastic ALI the licensee shall also demonstrate that the limit in Section 340.210(a)(1)(B) is 1mSv.

Section 340.250 Determination of Prior Occupational Dose

- a) For each individual who may enter the licensee's or registrant's restricted area and is likely to receive, in a year, an occupational dose requiring monitoring pursuant to Section 340.520, the licensee or registrant shall determine the occupational radiation dose received during the current year prior to allowing such individual to enter a restricted area. In order to comply with this requirement, a licensee or registrant may accept, as a record of the occupational dose that the individual received during the current year, a written signed statement from the individual, or from the individual's most recent employers for work involving radiation exposure, that discloses the nature and the amount of any occupational dose that the individual may have received during the current year. To accomplish this,

a licensee or registrant may use the Illinois Department of Nuclear Safety (IDNS) Form 5.

AGENCY NOTE: Licensees and registrants also should attempt to obtain the records of cumulative occupational radiation dose.

- b) Prior to permitting an individual to participate in a planned special exposure, the licensee shall:
 - 1) Determine the cumulative occupational radiation dose.
 - A) In order to comply with this requirement, a licensee may accept, as the record of cumulative radiation dose, an up-to-date IDNS Form 4, or equivalent, signed by the individual and countersigned by an appropriate official of the most recent employer for work involving radiation exposure, or the individual's current employers (if the individual is not employed by the licensee); and
 - B) Obtain reports of the individual's dose equivalent for the time period subsequent to that included in IDNS Form 4, or equivalent, as specified in subsection (1)(A) above. Such reports shall be signed by the individual and countersigned by an appropriate official(s) of the most recent employer(s) for work involving radiation exposure, or the individual's current employer(s) (if the individual is not employed by the licensee). The information shall be recorded on IDNS Form 5, or equivalent.
 - 2) Determine the internal and external doses from all previous planned special exposures.
 - 3) Determine all doses in excess of the limits received during the lifetime of the individual, including doses received during accidents and emergencies.
- c) The licensee or registrant shall record the exposure history, as required by subsections (a) and (b) above, on IDNS Form 4 or 5, as applicable, or other clear and legible record containing all of the information required on that form.
 - 1) The form or record shall show each period in which the individual received occupational exposure to sources of radiation and shall be signed by the individual who received the exposure. For each period for which the licensee or registrant obtains reports, the licensee or registrant shall use the dose shown in the report in preparing the exposure history. For any period in which the licensee or registrant does not obtain a report, the licensee or registrant shall place a notation on the exposure history indicating the periods of time for which data are not available.
 - 2) For the purpose of complying with this requirement, licensees or registrants are not required to reevaluate the separate external dose equivalents and internal committed dose equivalents or intakes of radionuclides assessed before January 1, 1994. Further, although occupational exposure histories obtained and recorded before January 1, 1994, would not have included effective dose equivalent, such histories may be used in the absence of specific information on the intake of radionuclides by the individual.
- d) If the licensee or registrant is unable to obtain a complete record of an individual's current and previously accumulated occupational dose, the licensee or registrant:

- 1) When establishing administrative controls pursuant to Section 340.210(g) for the current year, shall assume that the allowable dose limit for the individual is reduced by 12.5 mSv (1.25 rem) for each calendar quarter for which records were unavailable and the individual was engaged in activities that could have resulted in occupational radiation exposure; and
- 2) Shall not authorize the individual to receive any planned special exposures.
- e) Records shall be retained in accordance with the requirements of Section 340.1140(a).

Section 340.260 Planned Special Exposures

A licensee may authorize an adult worker to receive doses in addition to, and accounted for separately from, the doses received under the limits specified in Section 340.210 provided that each of the following conditions are satisfied:

- a) The licensee authorizes a planned special exposure only in an exceptional situation when alternatives that might avoid the higher exposure are unavailable or impractical.
- b) The management official of the licensee and employer, if the employer is not the licensee, specifically authorize the planned special exposure, in writing, before the exposure occurs.
- c) Before a planned special exposure, the licensee ensures that each individual involved is:
 - 1) Informed of the purpose of the planned operation; and
 - 2) Informed of the estimated doses and associated potential risks and specific radiation levels or other conditions that might be involved in performing the task; and
 - 3) Instructed in the measures to be taken to keep the dose ALARA considering other risks that may be present.
- d) Prior to permitting an individual to participate in a planned special exposure, the licensee ascertains previous doses received during the lifetime of the individual as required by Section 340.250(b).
- e) Subject to Section 340.210(b), the licensee shall not authorize a planned special exposure that would cause an individual's dose from all planned special exposures and all doses in excess of the limits to exceed:
 - 1) The numerical values of any of the dose limits in Section 340.210(a) in any year; and
 - 2) Five times the annual dose limits in Section 340.210(a) during the individual's lifetime.
- f) The licensee maintains records of the conduct of a planned special exposure in accordance with Section 340.1150 and submits a written report in accordance with Section 340.1240.
- g) The licensee records the best estimate of the dose resulting from the planned special exposure in the individual's record and informs the individual, in writing, of the dose within 30 days from the date of the planned special exposure. The dose from planned special exposure need not be considered in controlling future occupational dose of the individual pursuant to Section 340.210(a) but shall be included in evaluations required by subsections (d) and (e) above.

(Source: Amended at 19 Ill. Reg. 8264, effective June 12, 1995)

Section 340.270 Occupational Dose Limits for Minors

The annual occupational dose limits for minors are ten percent of the annual occupational dose limits specified for adult workers in Section 340.210.

Section 340.280 Dose to an Embryo/Fetus

- a) Except as otherwise provided in subsections (d) and (e) below, the licensee or registrant shall ensure that the dose to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant woman, does not exceed 5 mSv (0.5 rem). (For recordkeeping requirements, see Section 340.1160(d).)
- b) The dose to an embryo/fetus shall be taken as the sum of:
 - 1) The deep dose equivalent to the declared pregnant woman during the entire pregnancy; and
 - 2) The dose to the embryo/fetus from radionuclides in the embryo/fetus and radionuclides in the declared pregnant woman during the entire pregnancy.
- c) The licensee or registrant shall make efforts to avoid substantial variation above a uniform monthly exposure rate to a declared pregnant woman so as to satisfy the limit in subsection (a) above.
 AGENCY NOTE: The National Council on Radiation Protection and Measurements report entitled "Recommendations on Limits for Exposure to Ionizing Radiation," NCRP 91, published June 1, 1987, recommends that no more than 0.5 mSv (0.05 rem) of the allowed dose to the embryo/fetus be received during any one month during a declared pregnancy.
- d) If the declared pregnant woman has not notified the licensee or registrant of the estimated date of conception, the licensee or registrant shall ensure that the dose to an embryo/fetus, as specified in subsection (b) above, due to occupational exposure of the declared pregnant woman does not exceed 0.5 mSv (0.05 rem) per month, during the remainder of the pregnancy. If after initially declaring her pregnancy, a declared pregnant woman advises the licensee or registrant of the estimated date of conception, the dose limits specified in subsections (a) and (e) of this Section shall apply.
 AGENCY NOTE: The Department encourages licensees and registrants to explain to declared pregnant workers that providing an estimated date of conception will enable the licensee or registrant to more accurately assess the radiation dose to the embryo/fetus and assist the licensee or registrant in determining appropriate precautions to be taken for the remainder of the pregnancy.
- e) If by the time the woman informs the licensee or registrant of the estimated date of conception the dose to the embryo/fetus has exceeded 4.5 mSv (0.45 rem), the licensee or registrant shall be deemed to be in compliance with subsection (a) above if the additional dose to the embryo/fetus as specified in subsection (b) above does not exceed 0.5 mSv (0.05 rem) during the remainder of the pregnancy.

SUBPART D: RADIATION DOSE LIMITS FOR INDIVIDUAL MEMBERS OF THE PUBLIC

Section 340.310 Dose Limits for Individual Members of the Public

- a) Each licensee or registrant shall conduct operations so that:
 - 1) The dose in any unrestricted area from external sources does not exceed 0.02 mSv (0.002 rem) in any one hour; and

- 2) The total effective dose equivalent to individual members of the public from a radiation machine does not exceed:
 - A) 5 mSv (0.5 rem) in any year at any location within a facility where a radiation machine was installed before January 1, 1994, and the use of the radiation machine does not change on or after January 1, 1994; or
 - B) 1 mSv (0.1 rem) in any year at any location within a facility where a radiation machine is installed or where the radiation machine or its use changes on or after January 1, 1994.
AGENCY NOTE: It is the Department's intent to allow registrants using radiation machines in facilities designed to the 5 mSv (0.5 rem) limit to continue to use the 5 mSv (0.5 rem) total effective dose equivalent limit for a member of the public. This includes locations where the intensity of the radiation machine is not increased beyond the design basis, the type of radiation machine use is not changed and the type of facility use is not changed.
- 3) The total effective dose equivalent to individual members of the public from a licensed operation, exclusive of the dose contribution from a licensee's disposal of radioactive material into sanitary sewerage in accordance with Section 340.1030, does not exceed 1 mSv (0.1 rem) in any year.
- b) A licensee may apply for prior Department authorization to operate up to an annual dose limit for an individual member of the public of 5 mSv (0.5 rem). This application shall include the following information:
 - 1) Demonstration of the need for and the expected duration of operations in excess of the limit in subsection (a)(3) above;
 - 2) The licensee's or registrant's program to assess and control dose within the 5 mSv (0.5 rem) annual limit; and
 - 3) The procedures to be followed to maintain the dose ALARA.
- c) Prior to allowing a member of the public to enter a restricted area, the licensee or registrant shall give instructions on radiation hazards and protective measures to that individual.

(Source: Amended at 19 Ill. Reg. 8264, effective June 12, 1995)

Section 340.320 Compliance with Dose Limits for Individual Members of the Public

- a) The licensee or registrant shall make or cause to be made surveys of radiation levels in unrestricted areas. In addition, licensees shall survey radioactive materials in effluents released to unrestricted areas. These surveys are to demonstrate compliance with the dose limits for individual members of the public in Section 340.310.
- b) A licensee or registrant shall show compliance with the annual dose limit in Section 340.310 by:
 - 1) Demonstrating by measurement or calculation that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed or registered operation does not exceed the annual dose limit; or
 - 2) Demonstrating that:
 - A) The annual average concentrations of radioactive material released in gaseous and liquid effluents at the boundary of the unrestricted area do not exceed the values

specified in Table 2 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions; and

- B) If an individual were continuously present in an unrestricted area, the dose from external sources would not exceed 0.02 mSv (0.002 rem) in an hour and 0.5 mSv (0.05 rem) in a year.
- c) Upon approval from the Department, the licensee may adjust the effluent concentration values in Table 2 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions, for members of the public, to take into account the actual physical and chemical characteristics of the effluents (e.g., aerosol size distribution, solubility, density, radioactive decay equilibrium and chemical form).

SUBPART E: TESTING FOR LEAKAGE OR CONTAMINATION OF SEALED SOURCES

Section 340.410 Testing for Leakage or Contamination of Sealed Sources

- a) The licensee in possession of any sealed source shall assure that:
 - 1) Each sealed source, except as specified in subsection (b) below, is tested for leakage or contamination and the test results that confirm that the sealed source is not leaking or contaminated are received before the sealed source is put into use, unless the licensee has a certificate from the transferor indicating that the sealed source was tested within 6 months for beta and gamma emitting sources, or within 3 months for sources designed to emit alpha particles, before transfer to the licensee.
 - 2) Each sealed source that is not designed to emit alpha particles is tested for leakage or contamination at intervals not to exceed 6 months or at alternative intervals approved by the Department, pursuant to 32 Ill. Adm. Code 330.280(m), the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State.
 - 3) Each sealed source that is designed to emit alpha particles is tested for leakage or contamination at intervals not to exceed 3 months or at alternative intervals approved by the Department, pursuant to 32 Ill. Adm. Code 330.280(m), the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State.
 - 4) Each sealed source that is required to be tested for leakage or contamination shall be removed from service if there is reason to suspect that the sealed source may have been damaged or may be leaking or contaminated. The source shall be kept out of service until test results that confirm there is no leakage or contamination are received.
 - 5) Tests for leakage for all sealed sources, except brachytherapy sources manufactured to contain radium, shall be capable of detecting the presence of 185 Bq (0.005 uCi) of radioactive material on a test sample. Test samples shall be taken from the sealed source or from the surfaces of the container in which the sealed source is stored or mounted on which one might expect contamination to accumulate. For a sealed source contained in a device, test samples shall be obtained when the

source is in the "off" position. If setting the source to the "off" position would disrupt the licensee's activities, test samples may be obtained while the source is in the "on" position, provided that the dose likely to be received by the individual while obtaining the samples will not be so great as to require monitoring pursuant to Section 340.520(a).

- 6) The test for leakage for brachytherapy sources manufactured to contain radium shall be capable of detecting an absolute leakage rate of 37 Bq (0.001 uCi) of radon-222 in a 24 hour period when the collection efficiency for radon-222 and its daughters has been determined with respect to collection method, volume and time.
 - 7) Tests for contamination from radium daughters shall be taken on the interior surface of brachytherapy source storage containers and shall be capable of detecting the presence of 185 Bq (0.005 uCi) of a radium daughter which has a half-life greater than 4 days.
- b) A licensee need not perform tests for leakage or contamination on the following sealed sources:
- 1) Sealed sources containing only radioactive material with a half-life of less than 30 days;
 - 2) Sealed sources containing only radioactive material as a gas;
 - 3) Sealed sources containing 3.7 MBq (100 uCi) or less of beta or photon emitting material or 370 kBq (10 uCi) or less of alpha emitting material;
 - 4) Sealed sources containing only hydrogen-3;
 - 5) Seeds of iridium-192 encased in nylon ribbon;
 - 6) Sealed sources, except teletherapy and brachytherapy sources, that are stored, not being used and identified as in storage. The licensee shall, however, test each such sealed source for leakage or contamination and receive the test results that confirm that the sealed source is not leaking or contaminated before any use or transfer unless it has been tested for leakage or contamination within 6 months for beta and gamma emitting sources, or within 3 months for sources designed to emit alpha particles, before the date of use or transfer; and
 - 7) Sealed sources distributed under a license issued pursuant to 32 Ill. Adm. Code 330.280(m), but only if the evaluation sheet for those sealed sources, as filed in the "Radioactive Material Reference Manual" maintained by the Department of Health and Human Services or in the "Registry of Radioactive Sealed Sources and Devices" maintained by the U.S. Nuclear Regulatory Commission, specifies that testing for leakage or contamination is not required.
- c) Tests for leakage or contamination from sealed sources shall be performed by persons specifically authorized by the Department, an Agreement State, a Licensing State or the Nuclear Regulatory Commission to perform such services.
- d) Test results shall be kept as specified in Section 340.1135.
- e) The following shall be considered evidence that a sealed source is leaking:
- 1) The presence of 185 Bq (0.005 uCi) or more of removable contamination on any test sample.
 - 2) Leakage of 37 Bq (0.001 uCi) of radon-222 per 24 hours for brachytherapy sources manufactured to contain radium.
 - 3) The presence of removable contamination resulting from the decay of 185 Bq (0.005 uCi) or more of radium.

- f) The licensee shall immediately withdraw a leaking or contaminated sealed source from use and shall take action to prevent the spread of contamination. The leaking or contaminated sealed source shall be repaired, decontaminated or disposed of in accordance with this Part.
- g) Reports of test results for leaking or contaminated sealed sources shall be made pursuant to Section 340.1260.

(Source: Amended at 19 Ill. Reg. 8264, effective June 12, 1995)

SUBPART F: SURVEYS AND MONITORING

Section 340.510 General

- a) Each licensee or registrant shall make, or cause to be made, surveys:
 - 1) That demonstrate compliance with this Part; and
 - 2) That evaluate:
 - A) The extent of radiation levels;
 - B) Concentrations or quantities of radioactive material; and
 - C) The potential radiological hazards that could be present.
- b) The licensee or registrant shall ensure that instruments and equipment used for quantitative radiation measurements (e.g., dose rate and effluent monitoring) are calibrated at intervals not to exceed 12 months for the radiation measured or at alternative intervals specified in regulations of the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State. To satisfy this requirement, the licensee shall:
 - 1) Post a legible note on the instrument showing the date of calibration; and
 - 2) Ensure that instrument calibrations are performed by persons specifically licensed by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State to perform such calibrations.
- c) On each day of use, prior to using an instrument to perform required monitoring, the licensee or registrant shall verify that the instrument is operational. Operational checks for radiation measurement or radiation detection instruments shall include verification of response to a source of radiation.
- d) Except for those dosimeters used to measure the dose to any extremity, personnel dosimeters that require processing to determine the radiation dose and that are used by licensees or registrants to comply with Section 340.210, with other applicable provisions of 32 Ill. Adm. Code: Chapter II, Subchapters b and d or with conditions specified in a license shall be processed and evaluated by a qualified dosimetry processor. A dosimetry processor is qualified if:
 - 1) It holds current personnel dosimetry accreditation from the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Institute of Standards and Technology; and
 - 2) It is approved by NVLAP for the type of radiation or radiations that most closely approximate the type of radiation or radiations for which the individual wearing the dosimeter is monitored.
- e) A licensee or registrant shall obtain Department approval prior to using pocket ionization chambers or electronic dosimeters to determine radiation dose, to comply with Section 340.210, or with other applicable provisions of 32 Ill. Adm. Code: Chapter II, Subchapters b and d or with conditions specified in a license. The Department will

grant approval provided the licensee or registrant submits information describing the type and range of the dosimeters and describes a program to ensure the accuracy, reliability, precision and security of the dosimetry data.

- f) The licensee or registrant shall ensure that adequate precautions are taken to prevent deceptive exposure of an individual monitoring device.

(Source: Amended at 19 Ill. Reg. 8264, effective June 12, 1995)

Section 340.520 Conditions Requiring Individual Monitoring of External and Internal Occupational Dose

Each licensee or registrant shall monitor doses from sources of radiation at levels sufficient to demonstrate compliance with the occupational dose limits of this Part. As a minimum:

- a) Each licensee or registrant shall monitor occupational dose from sources of radiation and shall supply and require the use of individual monitoring devices by:
- 1) Adults likely to receive, in 1 year from sources external to the body, a dose in excess of ten percent of the limits in Section 340.210(a);
 - 2) Minors and declared pregnant women likely to receive, in 1 year from sources external to the body, a dose in excess of ten percent of any of the applicable limits in Sections 340.270 or 340.280; and
 - 3) Individuals entering a high or very high radiation area.
- b) Each licensee shall monitor, to determine compliance with Section 340.240, the occupational intake of radioactive material by and assess the committed effective dose equivalent to:
- 1) Adults likely to receive, in 1 year, an intake in excess of ten percent of the applicable ALIs in Table 1, Columns 1 and 2 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions; and
 - 2) Minors and declared pregnant women likely to receive, in 1 year, a committed effective dose equivalent in excess of 0.5 mSv (0.05 rem).

Section 340.530 Location of Individual Monitoring Devices

Each licensee or registrant shall ensure that individuals who are required to monitor occupational doses in accordance with Section 340.520(a) wear individual monitoring devices as follows:

- a) An individual monitoring device used for monitoring the dose to the whole body shall be worn at the unshielded location of the whole body likely to receive the highest exposure. When a protective apron is worn, the location of the individual monitoring device is typically at the neck (collar).
- b) An individual monitoring device used for monitoring the dose to an embryo/fetus of a declared pregnant woman, pursuant to Section 340.280(a), shall be located at the waist under any protective apron being worn by the woman.
- c) An individual monitoring device used for monitoring the eye dose equivalent, to demonstrate compliance with Section 340.210(a)(2) (A), shall be located at the neck (collar), outside any protective apron being worn by the monitored individual, or at an unshielded location closer to the eye.
- d) An individual monitoring device used for monitoring the dose to the extremities, to demonstrate compliance with Section 340.210(a) (2)(B), shall be worn on the extremity

likely to receive the highest exposure. Each individual monitoring device shall be oriented to measure the highest dose to the extremity being monitored.

SUBPART G: CONTROL OF EXPOSURE FROM EXTERNAL SOURCES IN RESTRICTED AREAS

Section 340.610 Control of Access to High Radiation Areas

- a) The licensee shall ensure that each entrance or access point to a high radiation area has one or more of the following features:
- 1) A control device that, upon entry into the area, causes the level of radiation to be reduced below that level at which an individual might receive a deep dose equivalent of 1 mSv (0.1 rem) in 1 hour at 30 centimeters from the source of radiation or from any surface that the radiation penetrates; or
 - 2) A control device that energizes a conspicuous visible or audible alarm signal so that the individual entering the high radiation area and the supervisor of the activity are made aware of the entry; or
 - 3) Entryways that are locked, except during periods when access to the areas is required, with positive control over each individual entry.
- b) In place of the controls required by subsection (a) above for a high radiation area, the licensee may substitute continuous direct or electronic surveillance to enable action to be taken to prevent unauthorized entry.
- c) The licensee may apply to the Department for approval of alternative methods for controlling access to high radiation areas.
- d) The licensee shall establish the controls required by subsections (a) and (c) above in a way that does not prevent individuals from leaving a high radiation area.
- e) The licensee is not required to control each entrance or access point to a room or other area that is a high radiation area solely because of the presence of radioactive materials prepared for transport and packaged and labeled in accordance with the regulations of the U.S. Department of Transportation provided that:
- 1) The packages do not remain in the area longer than 3 days; and
 - 2) The dose rate at 1 meter from the external surface of any package does not exceed 0.1 mSv (0.01 rem) per hour.
- f) The licensee is not required to control entrance or access to rooms or other areas in hospitals solely because of the presence of patients containing radioactive material, provided that there are personnel in attendance who are taking the necessary precautions, as required by 32 Ill. Adm. Code 335, to prevent the exposure of individuals to radiation or radioactive material in excess of the limits established in this Part and to operate within the ALARA provisions of the licensee's radiation protection program.
- g) The registrant shall control entrance or access to rooms or other areas containing sources of radiation capable of producing a high radiation area as described in this Section in accordance with the requirements for access and control specified in other applicable Parts of 32 Ill. Adm. Code: Chapter II, Subchapters b and d (i.e., 32 Ill. Adm. Code 350 for industrial radiography, 32 Ill. Adm. Code 360 for use of x-rays in the healing arts and 32 Ill. Adm. Code 390 for particle accelerators).

Section 340.620 Control of Access to Very High Radiation Areas

In addition to the controls required by Section 340.610, the licensee or registrant shall institute measures to ensure that an individual is not able to gain unauthorized or inadvertent access to areas in which radiation levels could be encountered at 5 Gy (500 rad) or more in 1 hour at 1 meter from a source of radiation or any surface through which the radiation penetrates.

Section 340.630 Control of Access to Very High Radiation Areas - Irradiators

- a) This Section applies to licensees or registrants with sources of radiation in irradiators that are not self-shielded. This Section does not apply to sources of radiation that are used in teletherapy, in industrial radiography or in completely self-shielded irradiators in which the source is both stored and operated within the same radiation shielding barrier and, in the designed configuration of the irradiator, is always physically inaccessible to any individual and cannot create a radiation level of 5 Gy (500 rad) or more in 1 hour at 1 meter in an area that is accessible to any individual.
- b) Each area in which there may exist radiation levels in excess of 5 Gy (500 rad) in 1 hour at 1 meter from a source of radiation that is used to irradiate matter shall meet the following requirements:
 - 1) Each entrance or access point shall be equipped with entry control devices that:
 - A) Function automatically to prevent any individual from inadvertently entering a very high radiation area;
 - B) Permit deliberate entry into the area only after a control device is actuated that causes the radiation level within the area, from the source of radiation, to be reduced below that at which it would be possible for an individual to receive a deep dose equivalent in excess of 1 mSv (0.1 rem) in 1 hour; and
 - C) Prevent operation of the source of radiation if it would produce radiation levels in the area that could result in a deep dose equivalent to an individual in excess of 1 mSv (0.1 rem) in 1 hour.
 - 2) Additional control devices shall be provided so that, upon failure of the entry control devices to function as required by subsection (b)(1) above:
 - A) The radiation level within the area, from the source of radiation, is reduced below that at which it would be possible for an individual to receive a deep dose equivalent in excess of 1 mSv (0.1 rem) in 1 hour; and
 - B) Conspicuous visible and audible alarm signals are generated to make an individual attempting to enter the area aware of the hazard. The alarm signals shall be located so that at least one other authorized individual, who is physically present, familiar with the activity, and prepared to render or summon assistance, is made aware of the failure of the entry control devices.
 - 3) The licensee or registrant shall provide control devices so that, upon failure or removal of any physical radiation barriers, other than the shielded storage container for sealed sources:
 - A) The radiation level from the source of radiation is reduced below that at which it would be possible for an individual to receive a deep dose equivalent in excess of 1 mSv (0.1 rem) in 1 hour; and
 - B) Conspicuous visible and audible alarm signals are generated to make potentially affected individuals aware of the hazard and the licensee or registrant or at least one other individual, who is familiar with the activity and prepared to render or summon assistance, aware of the failure or removal of the physical barrier.
 - 4) When the shield for the stored sealed source is a liquid, the licensee shall provide means to monitor the integrity of the shield and to signal, automatically, loss of adequate shielding.
 - 5) Physical radiation barriers that comprise permanent structural components, such as walls, that have no credible probability of failure or removal in ordinary circumstances need not meet the requirements of subsections (b)(3) and (4) above.
 - 6) Each area shall be equipped with devices that will automatically generate conspicuous visible and audible alarm signals to alert personnel in the area before the source of radiation can be put into operation and in time for any individual in the area to operate a clearly identified control device, which must be installed in the area and which can prevent the source of radiation from being put into operation.
 - 7) Each area shall be controlled by use of devices and administrative procedures that ensure that the area is cleared of personnel prior to each use of the source of radiation.
 - 8) Each area shall be checked by a radiation measurement to ensure that, prior to the first individual's entry into the area after any use of the source of radiation, the radiation level from the source of radiation in the area is below that at which it would be possible for an individual to receive a deep dose equivalent in excess of 1 mSv (0.1 rem) in 1 hour.
 - 9) The entry control devices required in subsection (b)(1) above shall be tested for proper functioning (see Section 340.1190 for recordkeeping requirements).
 - A) Testing shall be conducted prior to initial operation with the source of radiation on any day, unless operations were continued uninterrupted from the previous day;
 - B) Testing shall be conducted prior to resumption of operation of the source of radiation after any unintentional interruption; and
 - C) The licensee or registrant shall submit and adhere to a schedule for periodic tests of the entry control and warning systems.
 - 10) The licensee or registrant shall not conduct operations, other than those necessary to place the source of radiation in safe condition or to effect repairs on controls, unless control devices are functioning properly.
 - 11) Entry and exit portals that are used in transporting matter to and from the irradiation area, and that are not intended for use by individuals, shall be controlled by such devices and administrative procedures as are necessary to physically protect and warn against inadvertent entry by any individual through these portals. Exit portals for irradiated matter shall be equipped to detect and signal the presence of any loose sealed sources that

are carried toward such an exit and to automatically prevent loose sealed sources from being carried out of the area.

- c) Registrants, licensees or applicants for licenses for sources of radiation that are within the purview of subsection (b) above and which will be used in a variety of positions or in locations (e.g., open fields or forests) that make it impracticable to comply with certain requirements of subsection (b) above, such as those for the automatic control of radiation levels, may apply to the Department for approval of alternative safety measures. Alternative safety measures shall provide personnel protection at least equivalent to those specified in subsection (b) above. At least one of the alternative measures shall include an entry-preventing interlock control based on a measurement of the radiation that ensures the absence of high radiation levels before an individual can gain access to the area where such sources of radiation are used.
- d) The entry control devices required by subsections (b) and (c) above shall be established in such a way that no individual will be prevented from leaving the area.

SUBPART H: RESPIRATORY PROTECTION AND CONTROLS TO RESTRICT INTERNAL EXPOSURE IN RESTRICTED AREAS

Section 340.710 Use of Process or Other Engineering Controls

The licensee shall use, to the extent practicable, process or other engineering controls (e.g., containment or ventilation) to control the concentrations of radioactive material in air.

Section 340.720 Use of Other Controls

When it is not practicable to apply process or other engineering controls to control the concentrations of radioactive material in air to values below those that define an airborne radioactivity area, the licensee shall, consistent with maintaining the total effective dose equivalent ALARA, increase monitoring and limit intakes by one or more of the following means:

- a) Control of access; or
- b) Limitation of exposure times; or
- c) Use of respiratory protection equipment; or
- d) Other controls.

Section 340.730 Use of Individual Respiratory Protection Equipment

- a) If the licensee uses respiratory protection equipment to limit intakes pursuant to Section 340.720:
 - 1) Except as provided in subsection (a)(2) below, the licensee shall use only respiratory protection equipment that is tested and certified or had certification extended by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration (NIOSH/MSHA).
 - 2) The licensee may use equipment that has not been tested or certified by NIOSH/MSHA, has not had certification extended by NIOSH/MSHA, or for which there is no schedule for testing or certification, provided the licensee has submitted to the Department and the Department has approved an application for authorized use of that equipment, including a demonstration by testing, or a demonstration on the basis of test information, that the material and performance characteristics of the equipment are capable of providing the proposed

degree of protection under anticipated conditions of use.

- 3) The licensee shall implement and maintain a respiratory protection program that includes:
 - A) Air sampling to identify the potential hazard, permit proper equipment selection, and estimate exposures;
 - B) Surveys and bioassays to evaluate actual intakes;
 - C) Testing of respirators for operability immediately prior to each use;
 - D) Written procedures regarding selection, fitting, issuance, maintenance and testing of respirators, including testing for operability immediately prior to each use; supervision and training of personnel; monitoring, including air sampling and bioassays; and recordkeeping; and
 - E) Determination by a physician prior to initial fitting of respirators, and at least every 12 months thereafter, that the individual user is physically able to use the respiratory protection equipment.
- 4) The licensee shall issue a written policy statement on respirator usage covering:
 - A) The use of process or other engineering controls, instead of respirators;
 - B) The routine, nonroutine and emergency use of respirators; and
 - C) The length of periods of respirator use and relief from respirator use.
- 5) The licensee shall advise each respirator user that the user may leave the area at any time for relief from respirator use in the event of equipment malfunction, physical or psychological distress, procedural or communication failure, significant deterioration of operating conditions or any other conditions that might require such relief.
- 6) The licensee shall use respiratory protection equipment within the equipment manufacturer's expressed limitations for type and mode of use and shall provide proper visual, communication and other special capabilities (e.g., adequate skin protection) when needed.
- b) When estimating exposure of individuals to airborne radioactive materials, the licensee may make allowance for respiratory protection equipment used to limit intakes pursuant to Section 340.720, provided that the following conditions, in addition to those in subsection (a) above, are satisfied:
 - 1) The licensee selects respiratory protection equipment that provides a protection factor, specified in Appendix A to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions, greater than the multiple by which peak concentrations of airborne radioactive materials in the working area are expected to exceed the values specified in Table 1, Column 3 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions. However, if the selection of respiratory protection equipment with a protection factor greater than the peak concentration is inconsistent with the goal specified in Section 340.720 of keeping the total effective dose equivalent ALARA, the licensee may select respiratory protection equipment with a lower protection factor provided that such a selection would result in a total effective dose equivalent that

is ALARA. The concentration of radioactive material in the air that is inhaled when respirators are worn may be initially estimated by dividing the average concentration in air, during each period of uninterrupted use, by the protection factor. If the exposure is later found to be greater than initially estimated, the corrected value shall be used; if the exposure is later found to be less than initially estimated, the corrected value may be used.

- 2) The licensee shall obtain authorization from the Department before assigning respiratory protection factors in excess of those specified in Appendix A to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions. The Department shall authorize all licensee to use higher protection factors on receipt of an application that:
 - A) Demonstrates that a need exists for higher protection factors; and
 - B) Demonstrates that the respiratory protection equipment provides these higher protection factors under the proposed conditions of use.
- c) The licensee shall use as emergency equipment only respiratory protection equipment that has been specifically certified or had certification extended for emergency use by NIOSH/MSHA.
- d) The licensee shall notify the Department, in writing, at least 30 days before the date that respiratory protection equipment is first used pursuant to the provisions of either subsection (a) or (b) above.

SUBPART I: STORAGE AND CONTROL OF LICENSED OR REGISTERED SOURCES OF RADIATION

Section 340.810 Security and Control of Licensed or Registered Sources of Radiation

- a) The licensee shall secure licensed radioactive material from unauthorized removal or access.
- b) The licensee shall maintain constant surveillance, and use devices or administrative procedures to prevent unauthorized use of licensed radioactive material that is in an unrestricted area and that is not in storage.
- c) The registrant shall secure registered radiation machines from unauthorized removal.
- d) The registrant shall use devices or administrative procedures to prevent unauthorized use of registered radiation machines.

SUBPART J: PRECAUTIONARY PROCEDURES

Section 340.910 Caution Signs

- a) Standard Radiation Symbol. Unless otherwise authorized by the Department, the symbol prescribed by this Part shall use the colors magenta, or purple, or black on yellow background. The symbol prescribed by this Part is the three-bladed design as shown in Section 340. Illustration A.
- b) Exception to Color Requirements for Standard Radiation Symbol. Notwithstanding the requirements of subsection (a) above, licensees or registrants are authorized to label sources, source holders, or device components containing sources of radiation that are subjected to high temperatures, with conspicuously etched or stamped radiation caution symbols and without a color requirement.

- c) Additional Information on Signs and Labels. In addition to the contents of signs and labels prescribed in this Part, the licensee or registrant may provide, on or near the required signs and labels, information to make individuals aware of potential radiation exposures and to minimize the exposures.

Section 340.920 Posting Requirements

- a) Posting of Radiation Areas. The licensee or registrant shall post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIATION AREA".
- b) Posting of High Radiation Areas. The licensee or registrant shall post each high radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, HIGH RADIATION AREA" or "DANGER, HIGH RADIATION AREA".
- c) Posting of Very High Radiation Areas. The licensee or registrant shall post each very high radiation area with a conspicuous sign or signs bearing the radiation symbol and words "GRAVE DANGER, VERY HIGH RADIATION AREA".
- d) Posting of Airborne Radioactivity Areas. The licensee shall post each airborne radioactivity area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, AIRBORNE RADIOACTIVITY AREA" or "DANGER, AIRBORNE RADIOACTIVITY AREA".
- e) Posting of Areas or Rooms in Which Licensed Material is Used or Stored. The licensee shall post each area or room in which there is used or stored an amount of licensed material exceeding ten times the quantity of such material specified in Appendix C to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions, with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL(S)" or "DANGER, RADIOACTIVE MATERIAL(S)".

Section 340.930 Exceptions to Posting Requirements

- a) A licensee or registrant is not required to post caution signs in areas or rooms containing sources of radiation for periods of less than 8 hours, if each of the following conditions is met:
 - 1) The sources of radiation are constantly attended during these periods by an individual who takes the precautions necessary to prevent the exposure of individuals to sources of radiation in excess of the limits established in this Part; and
 - 2) The area or room is subject to the licensee's or registrant's control.
- b) Rooms or other areas in hospitals that are occupied by patients are not required to be posted with caution signs pursuant to Section 340.920 provided that the patient door posting requirements of 32 Ill. Adm. Code 335.5030(a)(5) or 335.7030(b) are met.
- c) Rooms or other areas in hospitals that are occupied by patients are not required to be posted with caution signs, provided that:
 - 1) A patient being treated with a permanent implant could be released from confinement pursuant to 32 Ill. Adm. Code 335.2110; or
 - 2) A patient being treated with a therapeutic radiopharmaceutical could be released from confinement pursuant to 32 Ill. Adm. Code 335.5030(b).

- d) A room or area is not required to be posted with a caution sign because of the presence of a sealed source provided the radiation level at 30 centimeters (12 inches) from the surface of the sealed source container or housing does not exceed 0.05 mSv (0.005 rem) per hour.
- e) A room or area is not required to be posted with a caution sign because of the presence of radiation machines used solely for diagnosis in the healing arts.
- f) If a room or area in which radioactive material or radiation machines are used for the treatment of patients is required to be posted with the words, "*GRAVE DANGER, VERY HIGH RADIATION AREA*" in accordance with 340.920(c), the following words may be substituted: "*DANGER, VERY HIGH RADIATION AREA*".

(Source: Amended at 19 Ill. Reg. 8264, effective June 12, 1995)

Section 340.940 Labeling Containers and Radiation Machines

- a) The licensee shall ensure that each container of licensed material bears a durable, clearly visible label bearing the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL" or "DANGER, RADIOACTIVE MATERIAL". The label shall also provide information (such as the radionuclides present, an estimate of the quantity of radioactivity, the date for which the activity is estimated, radiation levels, kinds of materials and mass enrichment) to permit individuals handling or using the containers, or working in the vicinity of the containers, to take precautions to avoid or minimize exposures.
- b) Each licensee shall, prior to removal or disposal of empty uncontaminated containers to unrestricted areas, remove or deface the radioactive material label or otherwise clearly indicate that the container no longer contains radioactive materials.
- c) Each registrant shall ensure that each radiation machine is labeled in a manner that cautions individuals that radiation is produced when it is energized.

Section 340.950 Exemptions to Labeling Requirements

A licensee is not required to label:

- a) Containers holding licensed material in quantities less than the quantities listed in Appendix C to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions; or
- b) Containers holding licensed material in concentrations less than those specified in Table 3 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions; or
- c) Containers attended by an individual who takes the precautions (e.g., controlling access) necessary to prevent the exposure of individuals in excess of the limits established by this Part; or
- d) Containers when they are in transport, provided the containers are packaged and labeled in accordance with the regulations of the U.S. Department of Transportation; or
 AGENCY NOTE: Labeling of packages containing radioactive materials is required by the U.S. Department of Transportation if the amount and type of radioactive material exceeds the limits for an excepted quantity or article as defined and limited by 49 CFR 173.403(m) and (w) and 173.421 through 173.424, current as October 1, 1991, exclusive of subsequent amendments or editions.
- e) Containers that are accessible only to individuals authorized to handle or use them, or to work in the vicinity

of the containers, if the contents are identified to these individuals by a readily available written record (examples of containers of this type are containers in locations such as water-filled canals, storage vaults or hot cells). The record shall be retained as long as the containers are in use for the purpose indicated on the record; or

- f) Installed manufacturing or process equipment, such as piping and tanks.

Section 340.960 Procedures for Receiving and Opening Packages

- a) Each licensee who is authorized to receive a package containing quantities of radioactive material in excess of a Type A quantity, as defined in 32 Ill. Adm. Code 341.20, as listed in 49 CFR 173.435 published October 1, 1993, or as derived from 49 CFR 173.433 published October 1, 1993 shall:
 - 1) Make arrangements to receive the package when the carrier offers it for delivery; or
 - 2) Make arrangements to receive the notification of the arrival of the package at the carrier's terminal and to take possession of the package expeditiously.
- b) Each licensee shall:
 - 1) Monitor the external surfaces of a labeled package for radioactive contamination unless the package contains only radioactive material in the form of a gas or in special form radioactive material as defined in 32 Ill. Adm. Code 310.20;
 AGENCY NOTE: Labeled means labeled with a Radioactive White I, Radioactive Yellow II or Radioactive Yellow III label as specified in U.S. Department of Transportation regulations, 49 CFR 172.403 and 172.436-440, published October 1, 1993.
 - 2) Monitor the external surfaces of a labeled package for radiation levels unless the package contains quantities of radioactive material that are less than or equal to the Type A quantity, as defined in 32 Ill. Adm. Code 341.20, as listed in 49 CFR 173.435 published October 1, 1993, or as derived from 49 CFR 173.433 published October 1, 1993; and
 - 3) Monitor all packages known to contain radioactive material for radioactive contamination and radiation levels if there is evidence of degradation of package integrity, such as packages that are crushed, wet or damaged.
- c) The licensee shall perform the monitoring required by subsection (b) above as soon as practicable after receipt of the package, but not later than 3 hours after the package is received at the licensee's facility if it is received during the licensee's normal working hours or if there is evidence of degradation of package integrity, such as a package that is crushed, wet or damaged. If a package is received after working hours, and has no evidence of degradation of package integrity, the package shall be monitored no later than 3 hours from the beginning of the next working day.
- d) The licensee shall immediately notify the final delivery carrier and the Department by telephone, and shall confirm the initial contact within 24 hours by overnight letter or telefacsimile to the Department, when:
 - 1) Removable radioactive surface contamination exceeds the limits of 32 Ill. Adm. Code 341.150(h); or
 - 2) External radiation levels exceed the limits of 32 Ill. Adm. Code 341.150(i) and (j).
- e) Each licensee shall:

- 1) Establish, maintain and retain written procedures for safely opening packages in which radioactive material is received; and
- 2) Ensure that the procedures are followed and that special instructions for the type of package being opened are adhered to.

(Source: Amended at 19 Ill. Reg. 8264, effective June 12, 1995)

SUBPART K: WASTE DISPOSAL

Section 340.1010 General Requirements

- a) A licensee shall dispose of licensed material only:
 - 1) By transfer to an authorized recipient as provided in Section 340.1060 or in 32 Ill. Adm. Code 330, 332 or 601, or to the U.S. Department of Energy; or
 - 2) By release in effluents within the limits in Section 340.310; or
 - 3) As authorized pursuant to Sections 340.1020, 340.1030, 340.1040 or 340.1050.
- b) A person shall be specifically licensed by the Department prior to receiving waste containing licensed material from any other point of generation for:
 - 1) Treatment prior to disposal; or
 - 2) Treatment or disposal by incineration; or
 - 3) Disposal at a land disposal facility licensed pursuant to 32 Ill. Adm. Code 601; or
 - 4) Storage until transferred to a disposal facility authorized to receive the waste.

Section 340.1020 Method for Obtaining Approval of Proposed Disposal Procedures

A licensee or applicant for a license may apply to the Department for approval of proposed procedures, not otherwise authorized in 32 Ill. Adm. Code: Chapter II, Subchapters b and d, to dispose of licensed material generated in the licensee's operations. Each application shall include:

- a) A description of the waste containing licensed material to be disposed of, including the physical and chemical properties that have an impact on risk evaluation, and the proposed manner and conditions of waste disposal;
- b) An analysis and evaluation of pertinent information on the nature of the environment;
- c) The nature and location of other potentially affected facilities; and
- d) Analyses and procedures to ensure that doses are maintained ALARA and within the dose limits in this Part.

Section 340.1030 Disposal by Release into Sanitary Sewerage

- a) A licensee may discharge licensed material into sanitary sewerage if each of the following conditions is satisfied:
 - 1) The material is readily soluble, or is readily dispersible biological material, in water;
 - 2) The quantity of licensed radioactive material that the licensee releases into the sewer in 1 month divided by the average monthly volume of water released into the sewer by the licensee does not exceed the concentration listed in Table 3 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions;
 - 3) If more than one radionuclide is released, the following conditions must also be satisfied:
 - A) The licensee shall determine the fraction of the limit in Table 3 of Appendix B to 10

CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions, represented by discharges into sanitary sewerage by dividing the actual monthly average concentration of each radionuclide released by the licensee into the sewer by the concentration of that radionuclide listed in Table 3 of Appendix B to 10 CFR 20.1001 - 20.2401, effective January 1, 1994, exclusive of subsequent amendments or editions; and

- B) The sum of the fractions for each radionuclide required by subsection (a)(3)(A) above does not exceed unity;
- 4) The total quantity of licensed radioactive material that the licensee releases into sanitary sewerage in a year does not exceed 185 GBq (5 Ci) of hydrogen-3, 37 GBq (1 Ci) of carbon-14, and 37 GBq (1 Ci) of all other radioactive materials combined; and
- 5) In determining compliance with subsections (a)(1), (a)(2), (a)(3) and (a)(4) above, the licensee shall not include the activity from radioactive material excluded by subsection (b) below.
- b) Excreta from individuals undergoing medical diagnosis or therapy with radioactive material are not subject to the limitations contained in subsection (a) above.

Section 340.1040 Treatment or Disposal by Incineration

A licensee may treat or dispose of licensed material by incineration only in the amounts and forms specified in Section 340.1050 or as specifically approved by the Department pursuant to Section 340.1020.

Section 340.1050 Disposal of Specific Wastes

- a) A licensee may dispose of the following licensed material as if it were not radioactive:
 - 1) 1.85 kBq (0.05 uCi), or less, of hydrogen-3, carbon-14 or iodine-125 per gram of medium used for scintillation counting; and
 - 2) 1.85 kBq (0.05 uCi), or less, of hydrogen-3, carbon-14 or iodine-125 per gram of animal tissue, averaged over the weight of the entire animal.
- b) A licensee shall not dispose of tissue pursuant to subsection (a)(2) above in a manner that would permit its use either as food for humans or as animal feed.
- c) The licensee shall maintain records in accordance with Section 340.1180.

Section 340.1052 Classification of Radioactive Waste for Land Disposal

- a) Considerations. Determination of the classification of radioactive waste involves two considerations. First, consideration must be given to the concentration of long-lived radionuclides (and their shorter-lived precursors) whose potential hazard will persist long after such precautions as institutional controls, improved waste form and deeper disposal have ceased to be effective. These precautions delay the time when long-lived radionuclides could cause exposures. In addition, the magnitude of the potential dose is limited by the concentration and availability of the radionuclide at the time of exposure. Second, consideration must be given to the concentration of shorter-lived radionuclides for which requirements on institutional controls, waste form and disposal methods are effective.
- b) Classes of waste.

- 1) Class A waste is waste that is usually segregated from other waste classes at the disposal site. The physical form and characteristics of Class A waste must meet the minimum requirements set forth in Section 340.1055(a). If Class A waste also meets the stability requirements set forth in Section 340.1055(b), it is not necessary to segregate the waste for disposal.
 - 2) Class B waste is waste that must meet more rigorous requirements on waste form to ensure stability (as defined in 32 Ill. Adm. Code 601.20) after disposal. The physical form and characteristics of Class B waste must meet both the minimum and stability requirements set forth in Section 340.1055.
 - 3) Class C waste is waste that not only must meet more rigorous requirements on waste form to ensure stability but also requires additional measures at the disposal facility to protect against inadvertent intrusion. The physical form and characteristics of Class C waste must meet both the minimum and stability requirements set forth in Section 340.1055.
- c) Classification determined by long-lived radionuclides. If the radioactive waste contains only radionuclides listed in Table 1 below, classification shall be determined as follows:
- 1) If the concentration does not exceed 0.1 times the value in Table 1 below, the waste is Class A.
 - 2) If the concentration exceeds 0.1 times the value in Table 1 below, but does not exceed the value in Table 1 below, the waste is Class C.
 - 3) If the concentration exceeds the value in Table 1 below, the waste is not generally acceptable for land disposal.
 - 4) For wastes containing mixtures of radionuclides listed in Table 1 below, the total concentration shall be determined by the sum of fractions rule described in subsection (g) below.

as specified in subsection (f) below, if radioactive waste does not contain any nuclides listed in either Table 1 above or Table 2 below, it is Class A.

- 1) If the concentration does not exceed the value in Column 1, the waste is Class A.
- 2) If the concentration exceeds the value in Column 1 but does not exceed the value in Column 2, the waste is Class B.
- 3) If the concentration exceeds the value in Column 2 but does not exceed the value in Column 3, the waste is Class C.
- 4) If the concentration exceeds the value in Column 3, the waste is not generally acceptable for near-surface disposal.
- 5) For wastes containing mixtures of the radionuclides listed in Table 2 below, the total concentration shall be determined by the sum of fractions rule described in subsection (g) below.

Table 2

Radionuclide	Concentration, Column 1	curies / Column 2	cubic meter Column 3
Total of all radio-nuclides with less than 5-year half-life	700	--	--
H-3	40	--	--
Co-60	700	--	--
Ni-63	3.5	70	700
Ni-63 in activated metal	35	700	7000
Sr-90	0.04	150	7000
Cs-137	1	44	4600

AGENCY NOTE: There are no limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling and disposal will limit the concentrations for these wastes. These wastes shall be Class B unless the concentrations of other radionuclides in Table 2 above determine the waste to be Class C independent of these radionuclides.

- e) Classification determined by both long- and short-lived radionuclides. If the radioactive waste contains a mixture of radionuclides, some of which are listed in Table 1 above and some of which are listed in Table 2 above, classification shall be determined as follows:
- 1) If the concentration of a radionuclide listed in Table 1 above is less than 0.1 times the value listed in Table 1 above, the class shall be that determined by the concentration of radionuclides listed in Table 2 above.
 - 2) If the concentration of a radionuclide listed in Table 1 above exceeds 0.1 times the value listed in Table 1 above, but does not exceed the value in Table 1 above, the waste shall be Class C, provided the concentration of radionuclides listed in Table 2 above does not exceed the value shown in Column 3 of Table 2 above.

Table 1

Radionuclide	Concentration curies/cubic meter
C-14	8
C-14 in activated metal	80
Ni-59 in activated metal	220
Nb-94 in activated metal	0.2
Tc-99	3
I-129	0.08
Alpha emitting transuranic radionuclides with half-life greater than five years	100
Pu-241	3,500
Cm-242	20,000
Ra-226	100

AGENCY NOTE: Units are nanocuries per gram.

- d) Classification determined by short-lived radionuclides. If the waste does not contain any of the radionuclides listed in Table 1 above, classification shall be determined based on the concentrations shown in Table 2 below. However,

- f) Classification of wastes with radionuclides other than those listed in Tables 1 and 2 above. If the waste does not contain any radionuclides listed in either Tables 1 or 2 above, it is Class A.
- g) The sum of the fractions rule for mixtures of radionuclides. For determining classification for waste that contains a mixture of radionuclides, it is necessary to determine the sum of fractions by dividing each radionuclide's concentration by the appropriate limit and adding the resulting values. The appropriate limits must all be taken from the same column of the same table. The sum of the fractions for the column must be less than 1.0 if the waste class is to be determined by that column. Example: A waste contains Sr-90 in a concentration of 50 Ci/m³ and Cs-137 in a concentration of 22 Ci/m³. Since the concentrations both exceed the values in Column 1, Table 2, they must be compared to Column 2 values. For Sr-90 fraction, $50/150 = 0.33$, for Cs-137 fraction, $22/44 = 0.5$; the sum of the fractions = 0.83. Since the sum is less than 1.0, the waste is Class B.
- h) Determination of concentrations in wastes. The concentration of a radionuclide may be determined by indirect methods such as use of scaling factors which relate the inferred concentration of one radionuclide to another that is measured, or radionuclide material accountability, if there is reasonable assurance that the indirect methods can be correlated with actual measurements. The concentration of a radionuclide may be averaged over the volume of the waste, or weight of the waste if the units are expressed as nano-curies per gram.

Section 340.1055 Radioactive Waste Characteristics

- a) The following are minimum requirements for all classes of waste and are intended to facilitate handling and provide protection of health and safety of personnel at the disposal site.
 - 1) Wastes shall be packaged in conformance with the conditions of the license issued to the site operator to which the waste will be shipped. Where the conditions of the site license are more restrictive than the provisions of this Part, the site license conditions shall govern.
 - 2) Wastes shall not be packaged for disposal in cardboard or fiberboard boxes.
 - 3) Liquid waste shall be packaged in sufficient absorbent material to absorb twice the volume of the liquid.
 - 4) Solid waste containing liquid shall contain as little free-standing and non-corrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1% of the volume.
 - 5) Waste shall not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water.
 - 6) Waste shall not contain, or be capable of generating, quantities of toxic gases, vapors or fumes harmful to persons transporting, handling or disposing of the waste. This does not apply to radioactive gaseous waste packaged in accordance with subsection (a)(8) below.
 - 7) Waste must not be pyrophoric. Pyrophoric materials contained in wastes shall be treated, prepared and packaged to be nonflammable. (See 32 Ill. Adm. Code 601 for definition of pyrophoric.)
 - 8) Wastes in a gaseous form shall be packaged at an absolute pressure that does not exceed 1.5 atmospheres at 20~ C (68~ F). Total activity shall not exceed 100 Ci per container.
- 9) Wastes containing hazardous, biological, pathogenic or infectious material shall be treated to reduce to the maximum extent practicable the potential hazard from the non-radiological materials.
- b) The following requirements are intended to provide stability of the waste. Stability is intended to ensure that the waste does not degrade and affect overall stability of the site through slumping, collapse or other failure of the disposal unit and thereby lead to water infiltration. Stability is also a factor in limiting exposure to an inadvertent intruder, since it provides a recognizable and nondispersible waste.
 - 1) Waste shall have structural stability. A structurally stable waste form will generally maintain its physical dimensions and its form, under the expected disposal conditions such as weight of overburden and compaction equipment, the presence of moisture, and microbial activity, and internal factors such as radiation effects and chemical changes. Structural stability can be provided by the waste form itself, processing the waste to a stable form, or placing the waste in a disposal container or structure that provides stability after disposal.
 - 2) Notwithstanding the provisions in subsections (a)(3) and (a)(4) above, liquid wastes, or wastes containing liquid, shall be converted into a form that contains as little free-standing and non-corrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1% of the volume of the waste when the waste is in a disposal container designed to ensure stability, or 0.5% of the volume of the waste for waste processed to a stable form.
 - 3) Void spaces within the waste and between the waste and its package shall be reduced to the extent practicable.

Section 340.1057 Labeling

Each package of waste shall be clearly labeled to identify whether it is Class A, Class B or Class C waste, in accordance with Section 340.1052.

Section 340.1060 Transfer for Disposal and Manifests

- a) Each shipment of radioactive waste to a licensed land disposal facility shall be accompanied by a shipment manifest that contains the name, address and telephone number of the person generating the waste, as well as the name, address and telephone number or the name and U.S. Environmental Protection Agency hazardous waste identification number of the person transporting the waste. The manifest shall also indicate as completely as practicable: a physical description of the waste; the waste volume; radionuclide identity and quantity; the total radioactivity; and the principal chemical form. The solidification agent shall be specified. Wastes containing more than 0.1% chelating agents by weight shall be identified and the weight percentage of the chelating agent shall be estimated. Wastes classified as Class A, Class B or Class C in Section 340.1052 shall be clearly identified as such in the manifest. The total quantity of the radionuclides H-3, C-14, Tc-99 and I-129 shall be shown.
- b) The manifest required by this Section may be shipping papers used to meet USDOT or U.S. Environmental Protection Agency regulations (i.e., 40 CFR 262 and 263,

- revised as of July, 1984, exclusive of subsequent amendments or editions), or requirements of the receiver, provided all the required information is included.
- c) Each manifest shall include a certification by the waste generator that the materials being transported are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the USDOT and the Department. An authorized representative of the waste generator shall sign and date the manifest.
- d) Any licensee who transfers waste to a land disposal facility or a licensed waste collector shall comply with the following requirements. Any licensee who transfers waste to a licensed waste processor who treats or repackages waste shall comply with the requirements of subsections (d)(4) through (d)(8) below. A licensee shall:
- 1) Prepare all wastes so that the waste is classified according to Section 340.1052 and meets the waste characteristics requirements in Section 340.1055;
 - 2) Label each package of waste to identify whether it is Class A waste, Class B waste or Class C waste, in accordance with Section 340.1052;
 - 3) Conduct a quality control program to assure compliance with Sections 340.1052 and 340.1055; the program must include management evaluation of audits;
 - 4) Prepare shipping manifests to meet the requirements of subsections (a) and (c) above;
 - 5) Forward a copy of the manifest to the intended recipient at the time of shipment; or, deliver to a collector at the time the waste is collected, obtaining acknowledgement of receipt in the form of a signed copy of the manifest from the collector;
 - 6) Include one copy of the manifest with the shipment;
 - 7) Retain a copy of the manifest with documentation of acknowledgement of receipt as the record of transfer of licensed material as required by this Part; and
 - 8) For any shipments or any part of a shipment for which acknowledgement of receipt has not been received within the times set forth in this Section, conduct an investigation in accordance with this Section.
- e) Any waste collector licensee who handles only prepackaged waste shall:
- 1) Acknowledge receipt of the waste from the generator within one week after receipt by returning a signed copy of the manifest to the generator;
 - 2) Prepare a new manifest to reflect consolidated shipments; the new manifest shall serve as a listing or index for the detailed generator manifests. Copies of the generator manifests shall be a part of the new manifest. The waste collector may prepare a new manifest without attaching the generator manifests, provided the new manifest contains for each package the information specified in subsection (a) above. The collector licensee shall certify that nothing has been done to the waste which would invalidate the generator's certification;
 - 3) Forward a copy of the new manifest to the land disposal facility operator at the time of shipment;
 - 4) Include the new manifest with the shipment to the disposal site;
 - 5) Retain a copy of the manifest with documentation of acknowledgement of receipt as the record of transfer of licensed material as required by this Part, and retain information from generator manifests until disposition is authorized by the Department; and
- 6) For any shipments or any part of a shipment for which acknowledgement of receipt is not received within the times set forth in this Section, conduct an investigation in accordance with subsection (h) below.
- f) Any licensed waste processor who treats or repackages wastes shall:
- 1) Acknowledge receipt of the waste from the generator within one week after receipt by returning a signed copy of the manifest to the generator;
 - 2) Prepare a new manifest that meets the requirements of subsections (a), (b) and (c) above. Preparation of the new manifest reflects that the processor is responsible for the waste;
 - 3) Prepare all wastes so that the waste is classified according to Section 340.1052 and meets the waste characteristics requirement in Section 340.1055;
 - 4) Label each package of waste to identify whether it is Class A waste, Class B waste or Class C waste, in accordance with Sections 340.1052 and 340.1057 of this Part;
 - 5) Conduct a quality control program to assure compliance with Sections 340.1052 and 340.1055. This program shall include management evaluation of audits;
 - 6) Forward a copy of the new manifest to the disposal site operator or waste collector at the time of shipment, or deliver to a collector at the time the waste is collected, obtaining acknowledgement of receipt in the form of a signed copy of the manifest by the collector;
 - 7) Include the new manifest with the shipment;
 - 8) Retain copies of original manifests and new manifests with documentation of acknowledgement of receipt as the record of transfer of licensed material as required by this Part; and
 - 9) For any shipment or part of a shipment for which acknowledgement is not received within the times set forth in this Section, conduct an investigation in accordance with subsection (h) below.
- g) The land disposal facility operator shall:
- 1) Acknowledge receipt of the waste within one week after receipt by returning a signed copy of the manifest to the shipper. The shipper to be notified is the licensee who last possessed the waste and transferred the waste to the operator. The returned copy of the manifest shall indicate any discrepancies between materials listed on the manifest and materials received;
 - 2) Retain a copy of the manifest with documentation of acknowledgement of receipt as the record of transfer of licensed material as required by this Part, and retain information from generator manifests until disposition is authorized by the Department; and
 - 3) Notify the shipper (i.e., the generator, the collector or processor) and the Department when any shipment or part of a shipment has not arrived within 60 days after the advance manifest was received.
- h) Any shipment or part of a shipment for which acknowledgement is not received within the times set forth in this Section must:
- 1) Be investigated by the shipper if the shipper has not received notification of receipt within 20 days after transfer; and
 - 2) Be traced and reported. The investigation shall include tracing the shipment and filing a report with the Department. Each licensee who conducts a trace

investigation shall file a written report with the Department within 2 weeks after completion of the investigation.

Section 340.1070 Compliance with Environmental and Health Protection Regulations

Nothing in this Subpart K relieves the licensee from complying with other applicable federal, State and local regulations governing any other toxic or hazardous properties of materials that are disposed of pursuant to this Subpart.

SUBPART L: RECORDS

Section 340.1110 General Provisions

- a) Each licensee or registrant shall use the SI units becquerel, gray, sievert and coulomb/kilogram or the special units curie, rad, rem and roentgen, including multiples and subdivisions, and shall clearly indicate the units of all quantities on records required by this Part.
- b) The licensee or registrant shall make a clear distinction among the quantities entered on the records required by this Part (e.g., total effective dose equivalent, total organ dose equivalent, shallow dose equivalent, eye dose equivalent, deep dose equivalent, committed effective dose equivalent).
- c) No licensee or registrant shall subtract radiation exposures from official personnel monitoring records without the prior written approval of the Department.

Section 340.1120 Records of Radiation Protection Programs

- a) Each licensee or registrant shall maintain records of the radiation protection program required pursuant to Section 340.110, including:
 - 1) The provisions of the program; and
 - 2) Audits and other reviews of program content and implementation.
- b) The licensee or registrant shall retain the records required by subsection (a)(1) above until the Department terminates each license or registration for which the record is required. The licensee or registrant shall retain the records required by subsection (a)(2) above for 5 years after the record is made.

Section 340.1130 Records of Surveys and Calibrations

- a) Each licensee or registrant shall maintain records showing the results of surveys and calibrations required by Sections 340.510 and 340.960(b). The licensee or registrant shall retain these records for 5 years after the record is made.
 - 1) Records of surveys shall include:
 - A) The location and date of the survey and the model and serial number of the instrument used to perform the survey;
 - B) The identity of the individual performing the survey; and
 - C) The results of the survey and any corrective actions that were taken as a result.
 - 2) For each survey instrument calibrated in accordance with subsection 340.510(b), the licensee shall maintain the following records:
 - A) A copy of the licensee's own calibration procedures or a copy of a license issued by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State authorizing the person that

performed the calibrations to perform calibrations as a customer service; and

- B) A record identifying the manufacturer, model and serial number of the instrument that was calibrated, the calibration results, the identity of the individual who performed the calibration and the date of the calibration.
- 3) Each licensee authorized to perform instrument calibrations shall maintain a copy of each calibration document created in accordance with subsection (a)(2)(B) above and a copy of the procedures followed to perform that calibration.
- b) The licensee or registrant shall retain each of the following records until the Department terminates each license or registration for which the record is required:
 - 1) Records of the results of surveys to determine the dose from external sources of radiation that are used, in the absence of or in combination with individual monitoring data, in the assessment of individual dose equivalents;
 - 2) Records of the results of measurements and calculations that are used to determine individual intakes of radioactive material and that are used in the assessment of internal dose;
 - 3) Records showing the results of air sampling, surveys and bioassays required pursuant to Sections 340.730(a)(3)(A) and (B); and
 - 4) Records of the results of measurements and calculations used to evaluate the release of radioactive effluents to the environment.

(Source: Amended at 19 Ill. Reg. 8264, effective June 12, 1995)

Section 340.1135 Records of Tests for Leakage or Contamination of Sealed Sources

Records of tests for leakage or contamination required by Section 340.410 shall be kept in units of becquerel or microcurie and maintained for inspection by the Department for 5 years after the records are made.

Section 340.1140 Records of Prior Occupational Dose

- a) The licensee or registrant shall retain the records of prior occupational dose and exposure history as specified in Section 340.250 until the Department terminates each pertinent license or registration requiring this record. The licensee or registrant shall retain records used in preparing the prior occupational dose and exposure history for 3 years after the record is made.
- b) Upon termination of the license or registration, the records of prior occupational dose and exposure history shall be transferred to the Department.

Section 340.1150 Records of Planned Special Exposures

- a) For each use of the provisions of Section 340.260 for planned special exposures, the licensee shall maintain records that describe:
 - 1) The exceptional circumstances requiring the use of a planned special exposure;
 - 2) The name of the management official who authorized the planned special exposure and a copy of the signed authorization;
 - 3) What actions were necessary;
 - 4) Why the actions were necessary;
 - 5) What precautions were taken to assure that doses were maintained ALARA;

- 6) What individual and collective doses were expected to result; and
 - 7) The doses actually received in the planned special exposure.
- b) The licensee shall retain the records until the Department terminates each license for which these records are required.
- c) Upon termination of the license, the records of doses received during planned special exposures shall be transferred to the Department.

Section 340.1160 Records of Individual Monitoring Results

- a) Recordkeeping Requirement. Each licensee or registrant shall maintain records of doses received by all individuals for whom monitoring was required pursuant to Section 340.520, and records of doses received during planned special exposures, accidents and emergency conditions. These records shall include, when applicable:
- 1) The deep dose equivalent to the whole body, eye dose equivalent, shallow dose equivalent to the skin and shallow dose equivalent to the extremities;
 - 2) The estimated intake of radionuclides (see Section 340.220);
 - 3) The committed effective dose equivalent assigned to the intake of radionuclides;
 - 4) The specific information used to calculate the committed effective dose equivalent pursuant to Section 340.240(c);
 - 5) The total effective dose equivalent when required by Section 340.220; and
 - 6) The total of the deep dose equivalent and the committed dose equivalent to the organ receiving the highest total dose.
- AGENCY NOTE: Assessments of dose equivalent and records made using units in effect before January 1, 1994, need not be changed.
- b) Recordkeeping Frequency. The licensee or registrant shall make entries of the records specified in subsection (a) above at intervals not to exceed 1 year.
- c) Recordkeeping Format. The licensee or registrant shall maintain the records specified in subsection (a) above on IDNS Form 4 or 5, as applicable, in accordance with the instructions for the forms, or in clear and legible records containing all the information required by the forms.
- d) The licensee or registrant shall maintain the records of dose to an embryo/fetus with the records of dose to the declared pregnant woman. The declaration of pregnancy, and the estimated date of conception, shall also be kept on file, but may be maintained separately from the dose records.
- e) The licensee or registrant shall retain each required form or record until the Department terminates each license or registration for which the record is required.
- f) Upon termination of the license or registration, the records of doses received by individuals shall be transferred to the Department.

Section 340.1170 Records of Dose to Members of the Public

- a) Each licensee or registrant shall maintain records sufficient to demonstrate compliance with the dose limit for individual members of the public (see Sections 340.310 and 340.320).
- b) The licensee or registrant shall retain the records required by subsection (a) above until the Department terminates each license or registration for which the record is required.

Section 340.1180 Records of Waste Disposal

- a) Each licensee shall maintain records of the disposal of licensed materials made pursuant to Sections 340.1020, 340.1030, 340.1040, 340.1050, 340.1060 and 32 Ill. Adm. Code 601. Each licensee shall also maintain records of disposal by burial in soil, including burials authorized before January 28, 1981, pursuant to 10 CFR 20.304.
- AGENCY NOTE: Prior to January 28, 1981, the U.S. Nuclear Regulatory Commission permitted licensees to dispose of small quantities of licensed materials by burial in soil without specific Nuclear Regulatory Commission authorization. This was authorized pursuant to 10 CFR 20.304.
- b) The licensee shall retain the records required by subsection (a) above until the Department terminates each license for which the record is required.

Section 340.1190 Records of Testing Entry Control Devices for Very High Radiation Areas

- a) Each licensee or registrant shall maintain records of tests made pursuant to Section 340.630(b)(9) on entry control devices for very high radiation areas. These records must include the date, time and results of each such test of function.
- b) The licensee or registrant shall retain the records required by subsection (a) above for 3 years after the record is made.

Section 340.1195 Form of Records

Each record required by this Part shall be legible throughout the specified retention period. The record shall be the original or a reproduced copy or a microform provided that the copy or microform is authenticated by authorized personnel. The microform shall be capable of producing a clear copy throughout the required retention period. Records may be stored in electronic media with the capability for producing legible, accurate and complete records during the required retention period. Records, such as letters, drawings and specifications, shall include all pertinent information, such as stamps, initials and signatures. The licensee or registrant shall maintain adequate safeguards against tampering with and loss of records.

SUBPART M: REPORTS AND NOTIFICATIONS

Section 340.1210 Reports of Stolen, Lost or Missing Sources of Radiation

- a) Telephone Reports. Each licensee or registrant shall report to the Department by telephone each stolen, lost or missing source of radiation immediately after its absence becomes known to the licensee or registrant. This requirement does not apply to sources of radiation that are not required to be licensed or registered.
- b) Written Reports. Each licensee or registrant required to make a report pursuant to subsection (a) above shall, within 30 days after making the telephone report, make a written report to the Department setting forth the following information:
- 1) A description of the source of radiation involved, including for radioactive material, the kind, quantity and chemical and physical form; and, for radiation machines, the type of unit, the manufacturer, model and serial number;
 - 2) A description of the circumstances under which the loss or theft occurred;

- 3) A statement of disposition, or probable disposition, of the source of radiation involved;
 - 4) Exposures of individuals to radiation, circumstances under which the exposures occurred, and the possible total effective dose equivalent to persons in unrestricted areas;
 - 5) Actions that have been taken, or will be taken, to recover the source of radiation; and
 - 6) Procedures or measures that have been, or will be, adopted to ensure against a recurrence of the theft or loss of sources of radiation.
- c) Subsequent to filing the written report, the licensee or registrant shall also report any additional substantive information on the loss or theft within 30 days after the licensee or registrant learns of such information.
- d) The licensee or registrant shall prepare any report filed with the Department pursuant to this Section so that names of individuals who may have received exposure to radiation are stated in a separate and detachable portion of the report.

Section 340.1220 Notification of Incidents

- a) Immediate Notification. Notwithstanding any other requirements for notification, each licensee or registrant shall immediately report to the Department discovery of an event that prevents immediate protective actions necessary to avoid releases of radioactive material or doses in excess of the regulatory limits, or each event involving a source of radiation possessed by the licensee or registrant that may have caused or threatens to cause any of the following conditions:
- 1) An individual to receive:
 - A) A total effective dose equivalent of 0.25 Sv (25 rem) or more; or
 - B) An eye dose equivalent of 0.75 Sv (75 rem) or more; or
 - C) A shallow dose equivalent to the skin or extremities or a total organ dose equivalent of 2.5 Gy (250 rad) or more; or
 - 2) The release of radioactive material, inside or outside of a restricted area, so that, had an individual been present for 24 hours, the individual could have received an intake five times the ALI, except the provisions of this subsection do not apply to locations where personnel are not normally stationed during routine operations, such as hot cells or process enclosures.
- b) Twenty-four Hour Notification. Each licensee or registrant shall, within 24 hours of discovery of the event, report to the Department each event involving loss of control of a licensed or registered source of radiation possessed by the licensee or registrant that may have caused, or threatens to cause, any of the following conditions:
- 1) An individual to receive, in a period of 24 hours:
 - A) A total effective dose equivalent exceeding 0.05 Sv (5 rem); or
 - B) An eye dose equivalent exceeding 0.15 Sv (15 rem); or
 - C) A shallow dose equivalent to the skin or extremities or a total organ dose equivalent exceeding 0.5 Sv (50 rem); or
 - 2) The release of radioactive material, inside or outside of a restricted area, so that, had an individual been present for 24 hours, the individual could have received an intake in excess of one occupational ALI, except the provisions of this subsection do not apply to locations where personnel are not normally stationed during routine operations, such as hot cells or process enclosures.
- c) Additional Twenty-four Hour Notifications for Licensees. Each licensee shall notify the Department within 24 hours after the discovery of any of the following events involving radioactive material:
- 1) An unplanned contamination event that:
 - A) Requires access to the contaminated area by workers or the public to be restricted for more than 24 hours by imposing radiological controls in addition to those established by the licensee prior to the event or by prohibiting entry into the area;
 - B) Involves a quantity of material greater than five times the lowest annual limit on intake specified in 10 CFR 20, Appendix B, effective January 1, 1994, for the material; and
 - C) Results in access to the area being restricted for a reason other than to either comply with operating procedures established by the licensee, or to allow radionuclides with a half-life of less than 24 hours to decay prior to decontamination.
 - 2) An event in which equipment is disabled or fails to function as designated when:
 - A) The equipment is required by regulation or license condition to prevent releases or doses exceeding regulatory limits, or to mitigate the consequences of an accident;
 - B) The equipment is required to be available and operable when it is disabled or fails to function; and
 - C) No redundant equipment is available and operable to perform the required safety function.
 - 3) An event that requires unplanned medical treatment at a medical facility of an individual with radioactive contamination on the individual's clothing or body.
 - 4) An unplanned fire or explosion damaging any licensed material or any device, container or equipment containing licensed material when:
 - A) The quantity of material involved is greater than five times the lowest annual limit on intake specified in 10 CFR 20, Appendix B, effective January 1, 1994, for the material; and
 - B) The damage affects the integrity of the licensed material or its container.
- d) Licensees or registrants shall make the reports required by subsections (a), (b) and (c) above by initial contact by telephone to the Department and shall confirm the initial contact within 24 hours by overnight letter or telefacsimile to the Department.
- e) The licensee or registrant shall prepare each written report filed with the Department pursuant to this Section so that names of individuals who have received exposure to sources of radiation are stated in a separate and detachable portion of the report.
- f) The provisions of this Section do not apply to doses that result from planned special exposures, provided such doses are within the limits for planned special exposures and are reported pursuant to Section 340.1240.

(Source: Amended at 19 Ill. Reg. 8264, effective June 12, 1995)

Section 340.1230 Reports of Exposures, Radiation Levels and Concentrations of Radioactive Material Exceeding the Limits

- a) Reportable Events. In addition to the notification required by Section 340.1220, each licensee or registrant shall submit a written report to the Department within 30 days after learning of any of the following occurrences:
- 1) Incidents for which notification is required by Section 340.1220; or
 - 2) Doses in excess of any of the following:
 - A) The occupational dose limits for adults in Section 340.210; or
 - B) The occupational dose limits for a minor in Section 340.270; or
 - C) The limits for an embryo/fetus of a declared pregnant woman in Section 340.280; or
 - D) The limits for an individual member of the public in Section 340.310; or
 - E) Any applicable limit in the license; or
 - 3) Levels of radiation or concentrations of radioactive material in:
 - A) A restricted area in excess of any applicable limit in the license; or
 - B) An unrestricted area in excess of ten times any applicable limit set forth in this Part or ten times any applicable limit set forth in the license, whether or not involving exposure of any individual in excess of the limits in Section 340.310; or
 - 4) For licensees subject to the provisions of the U.S. Environmental Protection Agency's generally applicable environmental radiation standards in 40 CFR 190, effective July 1, 1993, levels of radiation or releases of radioactive material in excess of those standards, or of license conditions related to those standards.
- b) Contents of Reports
- 1) Each report required by subsection (a) above shall include a description of the event, including the date, time and location of the event, the manufacturer and model number of any equipment that failed or malfunctioned and the identity, quantities and chemical forms of any radionuclides involved. Each report shall also describe the extent of exposure of individuals to radiation and radioactive material, including, as appropriate:
 - A) Estimates of each individual's dose;
 - B) The levels of radiation and concentrations of radioactive material involved;
 - C) The cause of the elevated exposures, dose rates or concentrations; and
 - D) Corrective steps taken or planned to ensure against a recurrence, including the schedule for achieving conformance with applicable limits, generally applicable environmental standards and associated license conditions.
 - 2) Each report filed pursuant to subsection (a) above shall include for each individual exposed: the name, Social Security account number and date of birth. With respect to the limit for the embryo/fetus in Section 340.280, the identifiers shall be those of the declared pregnant woman. The report shall be prepared so that this information is stated in a separate and detachable portion of the report.

(Source: Amended at 19 Ill. Reg. 8264, effective June 12, 1995)

The licensee shall submit a written report to the Department within 30 days following any planned special exposure conducted in accordance with Section 340.260, informing the Department that a planned special exposure was conducted and indicating the date the planned special exposure occurred and the information required by Section 340.1150.

Section 340.1250 Notifications and Reports to Individuals

- a) Requirements for notification and reports to individuals of exposure to radiation or radioactive material are specified in 32 Ill. Adm. Code 400.130.
- b) When a licensee or registrant is required pursuant to Section 340.1230 to report to the Department any exposure of an individual to radiation or radioactive material, the licensee or registrant shall also notify the individual. Such notice shall be transmitted at a time not later than the transmittal to the Department, and shall comply with the provisions of 32 Ill. Adm. Code 400.130(a).

Section 340.1260 Reports of Leaking or Contaminated Sealed Sources

The licensee shall file a report within 5 days with the Department if the test for leakage or contamination required pursuant to Section 340.410 indicates a sealed source is leaking or contaminated. The report shall describe the equipment involved, the test results and the corrective action taken.

Section 340.1270 Reports of Missing Waste Shipments

Each licensee who conducts a trace investigation pursuant to Section 340.1060(h) shall file a written report with the Department within 2 weeks after completion of the investigation.

SUBPART N: ADDITIONAL REQUIREMENTS**Section 340.1310 Vacating Premises**

Each specific licensee shall, no less than 30 days before vacating or relinquishing possession or control of premises which may have been contaminated with radioactive material as a result of his activities, notify the Department in writing of intent to vacate.

Section 340.1320 Removal of Radioactive Contamination

Notwithstanding any exemptions contained in this Part, any person who uses, possesses, or stores radioactive material in such a manner as to cause uncontrolled contamination of any area shall, upon order of the Department, remove or provide for the removal of such contaminants at his own expense through the use of an authorized transferee and shall decontaminate the installation to the lowest practicable level. Unless another value is specified in 32 Ill. Adm. Code 332, the values specified in Section 340. Appendix A may be used as guidelines for this purpose. These values, however, may be modified at specific installations at the discretion of the Department.

Section 340.1240 Reports of Planned Special Exposures

Ch. II, Sec. 340.APPENDIX A

Section 340.APPENDIX A Decontamination Guidelines

a) Surface Contamination Guide

Alpha Emitters:

Removable	555	mBq per	100 cm(2) =	average
	15	pCi per	100 cm(2) =	over any
	33	dpm per	100 cm(2)	one surface
	1.67	Bq per	100 cm(2) =	maximum
	45	pCi per	100 cm(2) =	
	100	dpm per	100 cm(2)	
Total	16.7	Bq per	100 cm(2) =	average
(fixed)	450	pCi per	100 cm(2) =	over any
	1,000	dpm per	100 cm(2)	one surface
	83.3	Bq per	100 cm(2) =	maximum
	2,250	pCi per	100 cm(2) =	
	5,000	dpm per	100 cm(2)	

2.5 microSv per hour at 1 cm from surface =
250 microrem per hour at 1 cm from surface

Beta-Gamma Emitters:

Removable	3.7	Bq per	100 cm(2) =	average
(all beta-gamma	100	pCi per	100 cm(2)	over any
emitters except				one surface
hydrogen-3)				
	18.5	Bq per	100 cm(2) =	maximum
	500	pCi per	100 cm(2)	
Removable	37	Bq per	100 cm(2) =	average
(hydrogen-3)	1,000	pCi per	100 cm(2)	over any
				one surface
	185	Bq per	100 cm(2) =	maximum
	5,000	pCi per	100 cm(2)	

Total 2.5 microSv per hour at 1 cm from surface =
(fixed) 250 microrem per hour at 1 cm from surface

b) Concentration in air and water: Appendix B, Table I and II of 10 CFR 20.

c) Concentrations in soil and other materials except water:

1) Radioactive material except source material and radium: Column II of 32 Ill. Adm. Code 330.Appendix A.

2) Source material and radium: Concentration of radionuclides above background concentrations for total radium, averaged over areas of 100 square meters, shall not exceed:

A) 185 mBq (5 pCi) per gram of dry soil, averaged over the first 15 centimeters below the surface; and

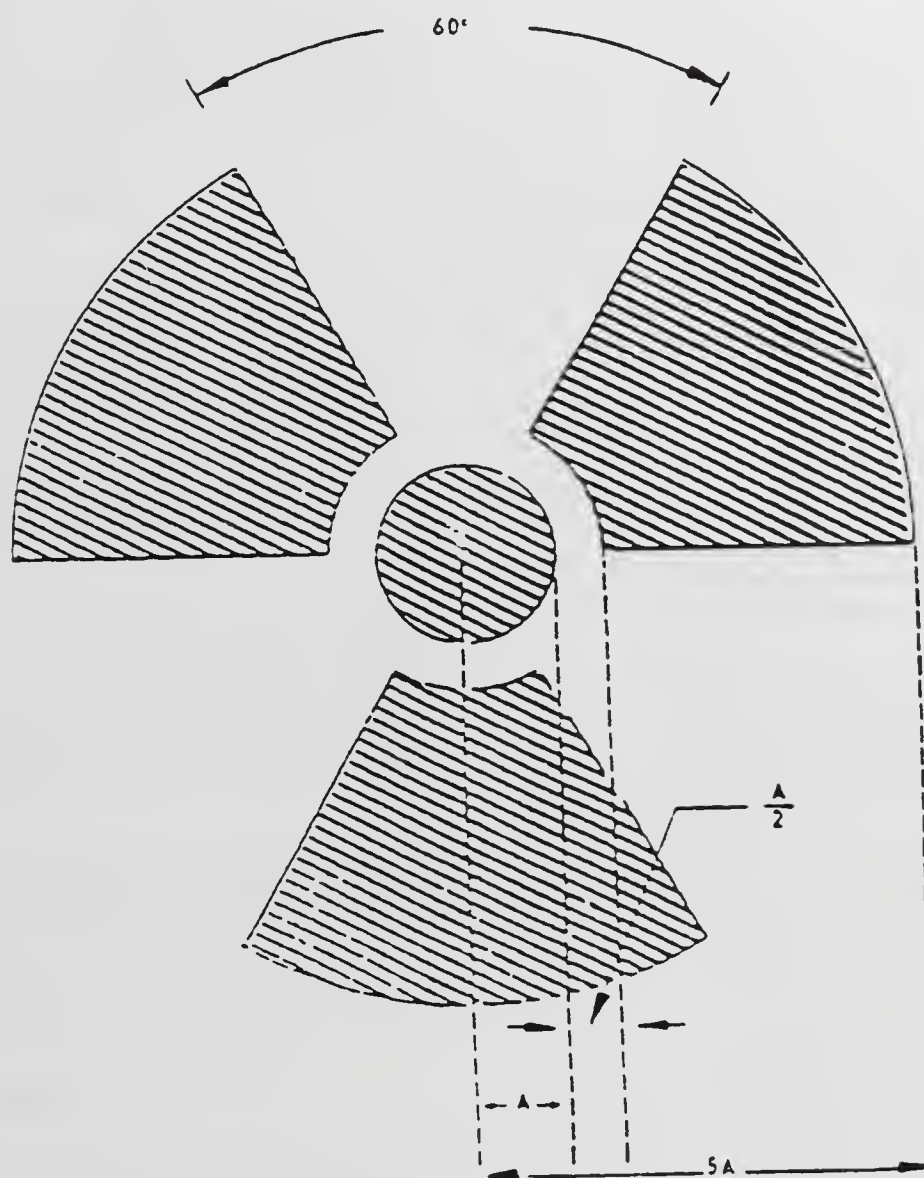
B) 185 mBq (5 pCi) per gram of dry soil, averaged over layers of 15 centimeters thickness more than 15 centimeters below the surface.

d) The level of gamma radiation measured at a distance of 100 centimeters from the surface shall not exceed background.

AGENCY NOTE: This Appendix shall be used only as a guide. The Department may require lower values in specific instances, depending upon radionuclides, type of surface, intended present and future use, etc.

Section 340. ILLUSTRATION A Radiation Symbol

1. Cross-hatched area is to be magenta or purple.
2. Background is to be yellow.

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

PART 341
TRANSPORTATION OF RADIOACTIVE
MATERIAL

Section	
341.10	Purpose and Scope
341.15	Incorporations by Reference
341.20	Definitions
341.30	Requirement for License
341.40	Exemptions
341.50	Transportation of Licensed Material
341.60	General Licenses for Carriers
341.70	General License: Approved Packages
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341.90	General License: DOT Specification Container
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341.110	General License: Type A, Fissile Class II Packages
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341.130	Fissile Material: Assumptions as to Unknown Properties
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341.200	Quality Assurance Requirements
APPENDIX A	Determination of A 1 and A 2 (Repealed)
TABLE A	A 1 and A 2 Values for Radionuclides (Repealed)
TABLE B	Relationship Between A 1 and Emax for Beta Emitters (Repealed)
TABLE C	Relationship Between A 3 and the Atomic Number of the Radionuclide (Repealed)
TABLE D	Activity-Mass Relationships for Uranium/Thorium (Repealed)

AUTHORITY: Implementing and authorized by the Radiation Protection Act of 1990 (Ill. Rev. Stat. 1991, ch. 111 1/2, pars. 210-1 et seq.) 420 ILCS 40 , and Section 9 of the Illinois Low-Level Radioactive Waste Management Act (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 241-9) 420 ILCS 20/9 , and by Section 71(G) of the Civil Administrative Code of Illinois (Ill. Rev. Stat. 1991, ch. 127, par. 63b17G) 20 ILCS 2005/71(G) .

SOURCE: Adopted at 10 Ill. Reg. 17616, effective September 25, 1986; amended at 11 Ill. Reg. 5219, effective March 13, 1987; amended at 12 Ill. Reg. 2434, effective January 15, 1988; amended at 18 Ill. Reg. 4196, effective March 3, 1994.

NOTE: In this Part, superscript numbers are denoted by parentheses and subscript are denoted by brackets.

Section 341.10 Purpose and Scope

This Part establishes requirements for packaging, preparation for shipment and transportation of radioactive material and applies to any person who transports radioactive material or delivers radioactive material to a carrier for transport.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.15 Incorporations by Reference

All rules, standards and guidelines of agencies of the United States or nationally recognized organizations or associations that are incorporated by reference in this Part are incorporated as of the date specified in the reference and do not include any later amendments or editions. Copies of these rules, standards and guidelines that have been incorporated by reference are available for public inspection at the Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, Illinois.

(Source: Added at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.20 Definitions

As used in this Part, the following definitions apply:

"A 1 " means the maximum activity of special form radioactive material permitted in a Type A package as listed in 49 CFR 173.435 or as derived from 49 CFR 173.433.

"A 2 " means the maximum activity of radioactive material, other than special form radioactive material, permitted in a Type A package. Values for A 2 are listed in 49 CFR 173.435 or can be derived from 49 CFR 173.433.

AGENCY NOTE: Values for A 1 and A 2 are listed in the U.S. Department of Transportation (U.S. DOT) regulations, 49 CFR 173.435 or can be derived from 49 CFR 173.433, published October 1, 1992, exclusive of subsequent amendments or editions.

"Carrier" means a person engaged in the transportation of passengers or property by land or water as a common, contract or private carrier or by civil aircraft.

"Exclusive use" (also referred to in regulations of the U.S. Department of Transportation as "sole use" or "full load") means the sole use of a conveyance by a single consignor and for which all initial, intermediate and final loading and unloading are carried out in accordance with the direction of the consignor or consignee.

"Fissile material" means any special nuclear material consisting of or containing one or more fissile radionuclides. Fissile radionuclides are plutonium-238, plutonium-239, plutonium-241, uranium-233 and uranium-235. Neither natural nor depleted uranium is fissile material.

AGENCY NOTE: Department of Nuclear Safety (Department) jurisdiction extends to special nuclear material only if quantities are not sufficient to form a critical mass as defined in 32 Ill. Adm. Code 310.

Fissile Class I: A package which may be transported in unlimited numbers and in any arrangement and which requires no nuclear criticality safety controls during transportation.

Fissile Class II: A package which may be transported together with other packages in any arrangement but, for criticality control, in numbers which do not exceed an aggregate transport index of 50. These shipments require no other nuclear criticality safety control during transportation. Individual packages may have a transport index not less than 0.1 and not more than 10.

AGENCY NOTE: A transport index is not assigned for purposes of nuclear criticality safety

but may be required because of external radiation levels.

"Low specific activity material" means any of the following:

Uranium or thorium ores and physical or chemical concentrates of those ores;
Unirradiated natural or depleted uranium or unirradiated natural thorium;
Tritium oxide in aqueous solutions provided the concentration does not exceed 185 MBq (5 mCi) per milliliter;
Material in which the radioactivity is essentially uniformly distributed and in which the estimated average concentration per gram of contents does not exceed:

3.7 kBq (100 nCi) of radionuclides for which the A 2 quantity in 49 CFR 173.433 or 173.435 is not more than 1.85 GBq (50 mCi);
185 kBq (5 microCi) of radionuclides for which the A 2 quantity in 49 CFR 173.433 or 173.435 is more than 1.85 GBq (50 mCi), but not more than 37 GBq (1 Ci); or
11.1 MBq (300 microCi) of radionuclides for which the A 2 quantity in 49 CFR 173.433 or 173.435 is more than 37 GBq (1 Ci).

Objects of non-radioactive material externally contaminated with radioactive material, provided that the radioactive material is not readily dispersible and the surface contamination, when averaged over an area of 1 square meter, does not exceed 3.7 kBq (100 nCi) (220,000 transformations per minute) per square centimeter of radionuclides for which the A 2 quantity in 49 CFR 173.433 or 173.435 is not more than 1.85 GBq (50 mCi), or 37 kBq (1 microCi) (2,200,000 disintegrations per minute) per square centimeter for other radionuclides.

AGENCY NOTE: Values for A 1 and A 2 are listed in 49 CFR 173.435 or can be derived from 49 CFR 173.433, published October 1, 1992, exclusive of subsequent amendments or editions.

"Normal form radioactive material" means radioactive material which has not been demonstrated to qualify as "special form radioactive material."

"Specific activity" of a radionuclide means the radioactivity of the radionuclide per unit mass of that nuclide. The specific activity of a material in which the radionuclide is essentially uniformly distributed is the radioactivity per unit mass of the material.

"Transport index" means the dimensionless number (rounded up to the decimal place) placed on the label of a package to designate the degree of control to be exercised by the carrier during transportation. The transport index is the number expressing the maximum radiation level in millirem per hour at 1 meter from the external surface of the package.

"Type A quantity" means a quantity of radioactive material, the aggregate radioactivity of which does not exceed A 1 for special form radioactive material or A 2 for normal form radioactive material, where A 1 and A 2 are given in 49 CFR 173.435 or may be determined by procedures described in 49 CFR 173.433.

AGENCY NOTE: Values for A 1 and A 2 are listed in 49 CFR 173.435 or can be derived from 49 CFR 173.433, published October 1, 1992, exclusive of subsequent amendments or editions.

"Type B package" means a Type B packaging together with its radio-active contents. A Type B package design is designated as B(U) or B(M). B(U) refers to the need for unilateral approval of international shipments; B(M) refers to the need for multilateral approval. There is no distinction made in how packages with these designations may be used in domestic transportation. To determine their distinction for international transportation, see (U.S. DOT) regulations in 49 CFR 173. A Type B package approved prior to September 6, 1983, was designated only as Type B. Limitations on its use are specified in Section 341.80.

"Type B packaging" means a packaging designed to retain the integrity of containment and shielding required by U.S. NRC regulations when subjected to the normal conditions of transport and hypothetical accident test conditions set forth in 10 CFR 71, published January 1, 1992, exclusive of subsequent amendments or editions.

"Type B quantity" means a quantity of radioactive material greater than a Type A quantity.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.30 Requirement for License

No person shall transport radioactive material or deliver radioactive material to a carrier for transport except as authorized in a general or specific license issued by the Department or as exempted in Section 341.40.

Section 341.40 Exemptions

- a) Common and contract carriers, freight forwarders and warehousemen who are subject to the requirements of the U.S. DOT in 49 CFR 170-189 or the U.S. Postal Service in the Postal Service Manual (Domestic Mail Manual), Section 124.3 incorporated by reference, 39 CFR 111.1 (1974), are exempt from this Part and 32 Ill. Adm. Code 310, 320, 330, 340, 350 and 400 to the extent that they receive, transport or store radioactive material in the regular course of their carriage for another or storage incident thereto. Common and contract carriers who are not subject to the requirements of the U.S. DOT or U.S. Postal Service are subject to Section 341.30 and other applicable Sections of this Part.
- b) Any licensee is exempt from the requirements of this Part to the extent that the licensee delivers to a carrier for transport a package containing radioactive material having a specific activity not greater than 74 Bq (2 nCi) per gram.
- c) A licensee is exempt from all requirements of this Part, other than Sections 341.50 and 341.160 with respect to shipment or carriage of the following:
 - 1) Packages containing no more than Type A quantities of radioactive material if the package contains no fissile material; or
 - 2) Packages, transported between locations within the United States, which contain only americium or plutonium in special form with an aggregate radioactivity not to exceed 740 GBq (20 Ci).

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.50 Transportation of Licensed Material

- a) No licensee may transport licensed material outside the confines of his plant or other place of use or deliver licensed material to a carrier for transport unless:
 - 1) Such transport and delivery is in compliance with the regulations of the U.S. DOT, 49 CFR 170-189, published October 1, 1992, exclusive of subsequent amendments or editions; and
 - 2) Any special instructions needed to safely open the package have been made available to the consignee.
- b) If, for any reason, the regulations of the U.S. DOT are not applicable to a shipment of licensed material, the licensee shall conform to the standards and requirements of those regulations to the same extent as if the shipment were subject to the regulations.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.60 General Licenses for Carriers

- a) A general license is hereby issued to any common or contract carrier not exempt under Section 341.40. The general license issued under this subsection only authorizes the licensee to receive, transport and store radioactive material in the regular course of its carriage for another or storage incident thereto, provided the transportation and storage is in accordance with U.S. DOT regulations (49 CFR 171-178, published October 1, 1992, exclusive of subsequent amendments or editions), insofar as such requirements relate to the loading and storage of packages, placarding of the transporting vehicle and incident reporting. Any reports of incidents required by 49 CFR 171-178 shall be filed with, or made to, the Department.
- b) A general license is hereby issued to any private carrier to transport radioactive material, provided the transportation is in accordance with U.S. DOT regulations (49 CFR 171-178, published October 1, 1992, exclusive of subsequent amendments or editions), insofar as such requirements relate to the loading and storage of packages, placarding of the transporting vehicle and incident reporting. Any reports of incidents required by 49 CFR 171-178 shall be filed with, or made to, the Department.
- c) Persons who transport radioactive material pursuant to the general licenses in subsection (a) or (b) above are exempt from the requirements of 32 Ill. Adm. Code 340 and 400 to the extent that they transport radioactive material.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.70 General License: Approved Packages

- a) A general license is hereby issued to any licensee of the Department to transport, or to deliver to a carrier for transport, licensed material in a package for which a license, certificate of compliance or other approval has been issued by the U.S. Nuclear Regulatory Commission.
- b) This general license applies only to a licensee who:
 - 1) Has a copy of the specific license, certificate of compliance, or other approval of the package and has the drawings and other documents referenced in the approval relating to the use and maintenance of the packaging and to the actions to be taken prior to shipment;

- 2) Complies with the terms and conditions of the license, certificate or other approval, as applicable, and the applicable requirements of this Section and Sections 341.50, 341.140, 341.150 and 341.170 through 341.200;
 - 3) Prior to the licensee's first use of the package, has registered with the U.S. Nuclear Regulatory Commission; and
 - 4) Has a quality assurance program as required by Section 341.200 approved by the Department.
- c) The general license in subsection (a) above applies only when the package approval authorizes use of the package under this general license.
- d) For previously approved Type B packages which are not designated as either B(U) or B(M) in the NRC Certificate of Compliance, this general license is subject to additional restrictions of Section 341.80.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.80 Previously Approved Type B Packages

A Type B package previously approved by the NRC, but not designated as B(U) or B(M) in the NRC Certificate of Compliance, may be used under the general license of Section 341.70 with the following additional limitations:

- a) Fabrication of the packaging was satisfactorily completed before August 31, 1986, as demonstrated by application of its model number in accordance with U.S. NRC regulations 10 CFR 71, Subparts E, F, G and H, published January 1, 1992, exclusive of subsequent amendments or editions.
- b) The package may not be used for a shipment to a location outside the United States after August 31, 1986, except under special arrangement approved by the U.S. DOT in accordance with 49 CFR 173.471, published October 1, 1992, exclusive of subsequent amendments or editions.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.90 General License: DOT Specification Container

- a) A general license is issued to any licensee of the Department to transport or to deliver to a carrier for transport licensed material in a specification container for a Type B quantity of radioactive material as specified in the regulations of the U.S. DOT in 49 CFR 173 and 178, published October 1, 1992, exclusive of subsequent amendments or editions.
- b) This general license applies only to a licensee who has a quality assurance program approved by the Department as satisfying the provisions of Section 341.200.
- c) This general license applies only to a licensee who:
 - 1) Has a copy of the specifications in accordance with 49 CFR 178; and
 - 2) Complies with the terms and conditions of the specifications in accordance with 49 CFR 178 and the requirements of this Part.
- d) The general license in subsection (a) above is subject to the limitation that the specification container may not be used for a shipment to a location outside the United States after August 31, 1986, except under special arrangements approved by U.S. DOT in accordance with 49 CFR 173.472, published October 1, 1992, exclusive of subsequent amendments or editions.

Ch. II, Sec. 341.90

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.100 General License: Use of Foreign Approved Package

- a) A general license is issued to any licensee of the Department to transport or to deliver to a carrier for transport licensed material in a package the design of which has been approved in a foreign national competent authority certificate which has been revalidated by the U.S. DOT as meeting the applicable requirements of 49 CFR 171.12, published October 1, 1992, exclusive of subsequent amendments or editions.
- b) This general license applies only to shipments made to or from locations outside the United States.
- c) This general license applies only to a licensee who:
 - 1) Has a copy of the certificate, the revalidation and the drawings and other documents referenced in the certificate relating to the use and maintenance of the packaging and to the actions to be taken prior to shipment; and
 - 2) Complies with the terms and conditions of the certificate and revalidation and with the requirements of this Part.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.110 General License: Type A, Fissile Class II Packages

- a) A general license is hereby issued to any licensee to transport fissile material, or to deliver fissile material to a carrier for transport, if the material is shipped as a Fissile Class II package.
- b) This general license applies only when a package contains no more than a Type A quantity of radioactive material, including only one of the following:
 - 1) Up to 40 grams of uranium-235; or
 - 2) Up to 30 grams of uranium-233; or
 - 3) Up to 25 grams of the fissile radionuclides of plutonium, except that for encapsulated plutonium-beryllium neutron sources in special form, an A 1 quantity of plutonium may be present; or
 - 4) A combination of fissile radionuclides in which the sum of the ratios of the amount of each radionuclide to the corresponding maximum amounts in subsections (1) through (3) above does not exceed unity.
- c) This general license applies only when:
 - 1) A package containing more than 15 grams of fissile radionuclides is labeled with a transport index not less than the number given by the following equation, where the package contains x grams of uranium-235, y grams of uranium-233 and z grams of the fissile radionuclides of plutonium:

$$\text{minimum transport index} = (0.4x + 0.67y + Nz)(1 - (15/x + y + z))$$
 The transport index must be rounded up to one decimal place and may not exceed 10.0; or
 - 2) For a package in which the only fissile material is in the form of encapsulated plutonium-beryllium neutron sources in special form, the transport index based on criticality considerations shall be taken as 0.026 times the number of grams of the fissile radionuclides of plutonium in excess of 15 grams. The transport index must be rounded up to one decimal place and shall not exceed 10.0.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.120 General License: Restricted, Fissile Class II Package

- a) A general license is hereby issued to any licensee to transport fissile material, or to deliver fissile material to a carrier for transport, if the material is shipped as a Fissile Class II package.
- b) This general license applies only when:
 - 1) The package contains no more than a Type A quantity of radioactive material;
 - 2) Neither beryllium nor hydrogenous material enriched in deuterium is present;
 - 3) The total mass of graphite present does not exceed 150 times the total mass of uranium-235 plus plutonium;
 - 4) Substances having a higher hydrogen density than water, e.g. certain hydrocarbon oils, are not present, except that polyethylene may be used for packing or wrapping;
 - 5) Uranium-233 is not present and the amount of plutonium does not exceed one percent of the amount of uranium-235; and
 - 6) The amount of uranium-235 is limited as follows:
 - A) If the fissile radionuclides are not uniformly distributed, the maximum amount of uranium-235 per package may not exceed the value given as follows:

Uranium enrichment in weight percent of uranium-235 not exceeding	Permissible maximum grams of uranium-235 per package
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24	40
20	42
15	45
11	48
10	51
9.5	52
9	54
8.5	55
8	57
7.5	59
7	60
6.5	62
6	65
5.5	68
5	72
4.5	76
4	80
3.5	88
3	100
2.5	120
2	164
1.5	272
1.35	320
1	680
0.92	1200

AGENCY NOTE: Pursuant to its agreement with the U.S. Nuclear Regulatory Commission, Department jurisdiction extends only to 350 grams of uranium-235.

- B) If the fissile radionuclides are distributed uniformly (i.e., cannot form a lattice arrangement within the packaging) the maximum amount of uranium-235 per

package may not exceed the value given as follows:

Uranium enrichment in weight percent of uranium-235 not exceeding	Permissible maximum grams of uranium-235 per package
4	84
3.5	92
3	112
2.5	148
2	240
1.5	560
1.35	800

AGENCY NOTE: Pursuant to its agreement with the U.S. Nuclear Regulatory Commission, Department jurisdiction extends only to 350 grams of uranium-235.

- 7) The transport index of each package based on criticality considerations is taken as ten times the number of grams of uranium-235 in the package divided by the maximum allowable number of grams per package in accordance with subsections (6)(A) or (6)(B) above as applicable.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.130 Fissile Material: Assumptions as to Unknown Properties

When the isotopic abundance, mass, concentration, degree of irradiation, degree of moderation, or other pertinent property of fissile material in any package is not known, the licensee shall package the fissile material as if the unknown properties have credible values that will cause the maximum nuclear reactivity.

Section 341.140 Preliminary Determinations

Prior to the first use of any packaging for the shipment of radioactive material:

- The licensee shall ascertain that there are no defects in the packaging which could impact on compliance with the standards specified in 10 CFR 71, Subparts E and F, published January 1, 1992, exclusive of subsequent amendments or editions.
- Where the maximum normal operating pressure will exceed 34.3 kilopascal (5 psi) gauge, the licensee shall test the containment system at an internal pressure at least 50 percent higher than the maximum normal operating pressure to verify the capability of that system to maintain its structural integrity at that pressure.
- The licensee shall conspicuously and durably mark the packaging with its model number, gross weight and a package identification number assigned by the U.S. Nuclear Regulatory Commission. Prior to applying the model number, the licensee shall determine that the packaging has been fabricated in accordance with the design approved in the certificate of compliance issued by the U.S. Nuclear Regulatory Commission.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.150 Routine Determinations

Prior to each shipment of licensed material, the licensee shall ensure that the package with its contents satisfies the requirements of this Part and of the license. The licensee shall determine that:

- The package is proper for the contents to be shipped in accordance with 49 CFR 173.401-435;
- The package is in unimpaired physical condition except for superficial defects such as marks or dents;
- Each closure device of the packaging, including any required gasket, is properly installed and secured and free of defects;
- Any system for containing liquid is sealed and has space or other specified provision for expansion of the liquid in accordance with 10 CFR 71, Subpart F, published January 1, 1992, exclusive of subsequent amendments or editions;
- Any pressure relief device is operable and set in accordance with the certificate of compliance;
- The package has been loaded and closed in accordance with written procedures;
- Any structural part of the package which could be used to lift or tie down the package during transport is rendered inoperable for that purpose unless it satisfies design requirements specified in accordance with 10 CFR 71.45, published January 1, 1992, exclusive of subsequent amendments or editions;
- The package meets the following requirements for removable contamination:
 - The level of non-fixed (removable) radioactive contamination on the external surfaces of each package offered for shipment is as low as reasonably achievable. The level of non-fixed radioactive contamination may be determined by wiping an area of 300 square centimeters of the surface concerned with an absorbent material, using moderate pressure and measuring the activity on the wiping material. Sufficient measurements shall be taken in the most appropriate locations to yield a representative assessment of the non-fixed contamination levels. Except as provided in subsection (h)(2) below, the amount of radioactivity measured on any single wiping material when averaged over the surface wiped, shall not exceed the limits given in this subsection at any time during transport. Other methods of assessment of equal or greater efficiency may be used. When other methods are used, the detection efficiency of the method used shall be taken into account and in no case may the non-fixed contamination on the external surfaces of the package exceed ten times the limits listed as follows:

REMOVABLE EXTERNAL RADIOACTIVE CONTAMINATION WIPE LIMITS

Contaminant	Maximum Permissible Limits		
	Bq/cm(2)	microCi/cm(2)	dpm/cm(2)
Beta-gamma-emitting radionuclides; all radionuclides with half-lives less than 10 days; natural uranium; natural thorium; uranium-235; uranium-238; thorium-232; thorium-228; and thorium-230 when contained in ores or physical concentrates/.	0.37	10(-5)	22
All other alpha-emitting radionuclides/.	0.037	10(-6)	2.2

AGENCY NOTE: One generally-acceptable technique is to perform one wipe test per square meter of surface area of the package. Appropriate locations for wipes include the areas where the package might leak through sealing gaskets or a location where water might stand on the container.

- 2) In the case of packages transported as exclusive use shipments by rail or highway only, the non-fixed radioactive contamination at any time during transport shall not exceed ten times the levels prescribed in subsection (h)(1) above. The levels at the beginning of transport shall not exceed the levels prescribed in subsection (h)(1) above.
- i) External radiation levels around the package and around the vehicle, if applicable, will not exceed 2 mSv (200 mrem) per hour at any point on the external surface of the package at any time during transportation. The transport index shall not exceed 10.
- j) For a package transported as exclusive use by rail, highway, or water, radiation levels external to the package may exceed the limits specified in subsection (i) above but shall not exceed any of the following:
 - 1) 2 mSv (200 mrem) per hour on the accessible external surface of the package unless the following conditions are met, in which case the limit is 10 mSv (1 rem) per hour.
 - A) The shipment is made in a closed transport vehicle;
 - B) Provisions are made to secure the package so that its position within the vehicle remains fixed during transportation; and
 - C) There are no loading or unloading operations between the beginning and end of the transportation;
 - 2) 2 mSv (200 mrem) per hour at any point on the outer surface of the vehicle, including the upper and lower surfaces, or, in the case of an open vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load and on the lower external surface of the vehicle;
 - 3) 100 microSv (10 mrem) per hour at any point 2 meters from the vertical planes represented by the outer lateral surfaces of the vehicle, or, in the case of an open vehicle, at any point 2 meters from the vertical planes projected from the outer edges of the vehicle; and
 - 4) 20 microSv (2 mrem) per hour in any normally-occupied position of the vehicle, except that this provision does not apply to private motor carriers when persons occupying these positions are provided with special health supervision, personnel radiation exposure monitoring devices and training in accordance with 32 Ill. Adm. Code 400.
- k) A package shall be prepared for transport so that in still air at 38~ C (100~ F) and in the shade, no accessible surface of a package would have a temperature exceeding 50~ C (122~ F) in a nonexclusive use shipment or 82~ C (180~ F) in an exclusive use shipment. Accessible package surface temperatures shall not exceed these limits at any time during transportation.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.160 Air Transport of Plutonium

Notwithstanding the provisions of any general licenses and notwithstanding any exemptions stated directly in this Part or included indirectly by citation of U.S. DOT regulations, as may be applicable, the licensee shall assure that plutonium in any form is not transported by air or delivered to a carrier for air transport unless:

- a) The plutonium is contained in a medical device designed for individual human application; or

- b) The plutonium is contained in a material in which the specific activity is not greater than 74 Bq (2 nCi) per gram of material and in which the radioactivity is essentially uniformly distributed; or
- c) The plutonium is shipped in a single package containing no more than an A 2 quantity of plutonium in any isotope or form and is shipped in accordance with Section 341.50; or
- d) The plutonium is shipped in a package specifically authorized for the shipment of plutonium by air in the Certificate of Compliance for that package issued by the U.S. Nuclear Regulatory Commission.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.170 Records

- a) Each licensee shall maintain for a period of 2 years after shipment a record of each shipment of licensed material not exempt under Section 341.40, showing, where applicable:
 - 1) Identification of the packaging by model number;
 - 2) Verification that there are no defects in the packaging, as shipped which would prevent the package from meeting the standards of 10 CFR 71, Subparts E and F, published January 1, 1992, exclusive of subsequent amendments or editions;
 - 3) Volume and identification of coolant;
 - 4) Type and quantity of licensed material in each package and the total quantity of each shipment;
 - 5) Date of the shipment;
 - 6) Name and address of the transferee;
 - 7) Address to which the shipment was made; and
 - 8) Results of the determinations required by Section 341.130.
- b) The licensee shall make available to the Department for inspection, at any time during shipment or upon 3 days notice after shipment, all records required by this Part.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.180 Reports

The licensee shall report to the Department within 30 days:

- a) Any instance in which a reduction in the effectiveness of any authorized packaging impacts upon compliance with 10 CFR 71, Subparts E and F, published January 1, 1992, exclusive of subsequent amendments or editions; and
- b) Details of any defects in the packaging after first use impacting upon compliance with 10 CFR 71, Subparts E and F, published January 1, 1992, exclusive of subsequent amendments or editions, with the means employed to repair the defects and prevent their recurrence.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.190 Advance Notification of Transport of Nuclear Waste

- a) Licensees who transport radioactive waste or deliver radioactive waste to a carrier for transport outside of the confines of the licensee's facility or other place of use or storage, shall provide advance notification of such transport to the Governor or Governor's designee in accordance with subsection (b) below. Such notification shall include the Governor or Governor's designee of each

state through which the radioactive waste is to be transported.

AGENCY NOTE: A list of the mailing addresses of the Governors and Governors' designees is available upon request from the Director, Office of State Programs, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

- b) Advance notification is required only when:
- 1) The nuclear waste is required to be in Type B packaging for transportation;
 - 2) The nuclear waste is being transported to, through, or across state boundaries to a disposal site or to a collection point for transport to a disposal site;
 - 3) The quantity of licensed material in a single package exceeds:
 - A) 185 TBq (5 kCi) of special form radionuclides;
 - B) 185 TBq (5 kCi) of uncompressed gases of argon-41, krypton-85m, krypton-87, xenon-131m or xenon-135;
 - C) 1.85 PBq (50 kCi) of argon-37, or of uncompressed gases of krypton-85 or xenon-133, or of hydrogen-3 as a gas, as luminous paint or adsorbed on solid material;
 - D) 740 GBq (20 Ci) of other non-special form radionuclides for which A 2 is less than or equal to 148 GBq (4 Ci); or
 - E) 7.4 TBq (200 Ci) of other non-special form radionuclides for which A 2 is greater than 148 GBq (4 Ci).
- c) Each advance notification required by subsection (a) above shall contain the following information:
- 1) The name, address and telephone number of the shipper, carrier and receiver of the shipment;
 - 2) A description of the nuclear waste contained in the shipment as required by the regulations of the U.S. DOT, 49 CFR 172.202 and 172.203(d), published October 1, 1992;
AGENCY NOTE: Requirements contained in subsequent amendments or editions of 49 CFR 172 are not incorporated into this rule.
 - 3) The point of origin of the shipment and the 7-day period during which departure of the shipment is estimated to occur;
 - 4) The 7-day period during which arrival of the shipment at state boundaries is estimated to occur;
 - 5) The destination of the shipment and the 7-day period during which arrival of the shipment is estimated to occur; and
 - 6) A point of contact, with a telephone number, for current shipment information.
- d) The notification required by subsection (a) above shall be made in writing to the Office of the Governor or Governor's designee and to the Department. A notification delivered by mail shall be postmarked at least 7 days before the beginning of the 7-day period during which departure of the shipment is estimated to occur. A notification delivered by messenger shall reach the Office of the Governor or Governor's designee, at least 4 days before the beginning of the 7-day period during which departure of the shipment is estimated to occur. A copy of the notification shall be retained by the licensee for 1 year.
- e) The licensee shall notify the Governor, or Governor's designee and the Department of any changes to schedule information provided pursuant to subsection (a) above. Such notification shall be by telephone to a responsible individual in the Office of the Governor or Governor's designee and in the Department. The licensee shall

maintain for 1 year a record of the name of the individual contacted.

- f) Each licensee who cancels a nuclear waste shipment, for which advance notification has been sent, shall send a cancellation notice to the Governor or Governor's designee and to the Department. A copy of the notice shall be retained by the licensee for 1 year.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.200 Quality Assurance Requirements

- a) Each person licensed pursuant to this Part shall establish, maintain, and execute a quality assurance program to verify, by procedures such as checking, auditing and inspection, that deficiencies, deviations and defective material and equipment relating to the shipment of packages containing radioactive materials are promptly identified and corrected. Prior to the use of any package for the shipment of radioactive material, each licensee shall obtain Departmental approval of its quality assurance program. Such approval shall be in accordance with the U.S. Nuclear Regulatory Commission standards contained in Revision 1 of NRC Regulatory Guide #7.10, Establishing Quality Assurance Programs for Packaging Used in the Transport of Radioactive Material, published June 1986, exclusive of subsequent amendments or editions.
- b) Each person licensed pursuant to this Part shall document the quality assurance program by written procedures or instructions and shall carry out the program in accordance with those procedures throughout the period during which packaging is used. The licensee shall identify the material and components to be covered by the quality assurance program.
- c) A person licensed pursuant to this Part shall maintain sufficient written records to demonstrate compliance with the quality assurance program. Records pertaining to the use of a package for shipment of radioactive material shall be retained for a period of 2 years after shipment.

(Source: Amended at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.APPENDIX A Determination of A 1 and A 2 (Repealed)

(Source: Repealed at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.TABLE A A 1 and A 2 Values for Radionuclides (Repealed)

(Source: Repealed at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.TABLE B Relationship Between A 1 and E(max) for Beta Emitters (Repealed)

(Source: Repealed at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.TABLE C Relationship Between A 3 and the Atomic Number of the Radionuclide (Repealed)

(Source: Repealed at 18 Ill. Reg. 4196, effective March 3, 1994)

Section 341.TABLE D Activity-Mass Relationships for
Uranium/Thorium (Repealed)

(Source: Repealed at 18 Ill. Reg. 4196, effective March 3,
1994)

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SUBCHAPTER b: RADIATION PROTECTION
PART 350
RADIATION SAFETY REQUIREMENTS FOR INDUSTRIAL RADIOGRAPHIC OPERATIONS

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APPENDIX B	General Requirements for Inspection of Industrial Radiographic Equipment
APPENDIX C	Retention Requirements for Records

AUTHORITY: Implementing and authorized by the Radiation Protection Act of 1990 420 ILCS 40 .

SOURCE: Filed and effective April 20, 1974, by the Department of Public Health; transferred to the Department of Nuclear Safety by P.A. 81-1516, effective December 3, 1980; codified at 7 Ill. Reg. 14744; recodified at 10 Ill. Reg. 11265; amended at 10 Ill. Reg. 17287, effective September 25, 1986; amended at 13 Ill. Reg. 13592, effective August 11, 1989; amended at 18 Ill. Reg. 7263, effective May 2, 1994; expedited correction at 18 Ill. Reg. 10943, effective May 2, 1994; amended at 19 Ill. Reg. 8250, effective June 12, 1995; amended at 19 Ill. Reg. 16591, effective November 27, 1995.

SUBPART A: GENERAL PROVISIONS

Section 350.10 Purpose

This Part establishes radiation safety requirements for persons using sources of radiation for industrial radiography. The requirements of this Part are in addition to, and not in substitution for, other applicable requirements of 32 Ill. Adm. Code: Chapter II, Subchapters b and d.

(Source: Amended at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.20 Scope

This Part shall apply to all licensees or registrants who use sources of radiation for industrial radiography. Except when the requirements of this Part are clearly applicable only to sealed radioactive sources, or to radiation machines, the requirements of this Part apply to both sealed radioactive sources and radiation machines used for performing industrial radiography procedures. Section 350.3050 contains special requirements for enclosed radiography and cabinet x-ray systems. Section 350.3090 contains special requirements for underwater and lay-barge radiography. Nothing in this Part shall apply to the use of sources of radiation in the healing arts. Each licensee and registrant is responsible for ensuring that persons performing activities under a license or certificate of registration comply with 32 Ill. Adm. Code: Chapter II, Subchapters b and d, license conditions, if any, and orders of the Department.

(Source: Amended at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.25 Incorporations by Reference

- a) All rules, standards and guidelines of agencies of the United States or nationally recognized organizations or associations that are incorporated by reference in this Part are incorporated as of the date specified in the reference

and do not include any later amendments or editions. Copies of these rules, standards and guidelines that have been incorporated by reference are available for public inspection at the Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, Illinois.

- b) In addition, copies of ANSI standards may be obtained directly from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 and from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.

(Source: Added at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.30 Definitions

As used in this Part, the following definitions apply:

"ALARA" means as low as is reasonably achievable as defined in 32 Ill. Adm. Code 310.20.

"Associated equipment" means equipment used in conjunction with a radiographic exposure device to make radiographic exposure where such equipment drives, guides, or comes into contact with the source (i.e., guide tube, control tube, crank, removable source stop, "J" tube).

"Cabinet radiography" means industrial radiography conducted in an enclosure or cabinet so shielded that doses to individual members of the public at every location on the exterior meet the limitations specified in 32 Ill. Adm. Code 340.310(a).

"Cabinet x-ray system" means an x-ray system with the x-ray tube installed in an enclosure which, independent of existing architectural structures except the floor on which it may be placed, is intended to contain at least that portion of a material being irradiated, provide radiation attenuation and exclude personnel from its interior during generation of x radiation. Included are all x-ray systems designed primarily for the inspection of carry-on baggage at airline, railroad and bus terminals and in similar facilities. An x-ray tube used within a shielded part of a building or x-ray equipment which may temporarily or occasionally incorporate portable shielding is not considered a cabinet x-ray system.

"Collimator" means a radiation shield of lead or other heavy metal which is placed on the end of a guide tube or directly onto a radiographic exposure device to restrict the size and shape of the radiation beam when the sealed source is moved into position to make a radiographic exposure.

"Crank-out device" means the cable, protective sheath and handcrank used to move the sealed source from the shielded to the unshielded position to make an industrial radiographic exposure.

"Enclosed radiography" means industrial radiography conducted in an enclosed cabinet or room and includes cabinet radiography and shielded-room radiography.

"GED" means general equivalency diploma.

"Industrial radiography" means the process used to perform the examination of the macroscopic structure of materials by non-destructive methods using radioactive material or radiation machines.

"Lay-barge radiography" means industrial radiography performed on any water vessel used for laying pipe.

"Lixiscope" means a portable light-intensified imaging device using a sealed source.

"Lock-out survey" means a radiation survey performed to determine that a sealed source is in its shielded position. The lock-out survey is performed before moving the radiographic exposure device or source changer to a new location. The lock-out survey is also performed when securing the radiographic exposure device or source changer against unauthorized removal.

"Permanent radiographic installation" means an installation or structure designed or intended for radiography and in which radiography is regularly performed.

"Permanent use or storage location" means a location listed on a radioactive material license or a certificate of registration where sources of radiation are used or stored.

"Personal supervision" means the provision of guidance and instruction to a radiographer trainee by a radiographer who is:

physically present at the site;

in visual contact with the radiographer trainee while the trainee is using sources of radiation; and

in such proximity that immediate assistance can be given if required.

"Radiation safety officer" means an individual who is both designated as a radiation safety officer in accordance with Section 350.4020 and who meets the requirements of Section 350.4020 and 32 Ill. Adm. Code 310.20.

"Radiographer" means any individual who performs or personally supervises industrial radiographic operations. Radiographers shall meet the requirements of Section 350.2010(a) and shall comply with the requirements of 32 Ill. Adm. Code: Chapter II, Subchapters b and d, all license conditions, if any, and orders of the Department.

"Radiographer trainee" means any individual who uses sources of radiation and related handling tool or radiation survey instruments under the personal supervision of a radiographer. Radiographer trainees shall meet the requirements of Section 350.2010(b) and shall comply with the requirements of 32 Ill. Adm. Code: Chapter II, Subchapters b and d, all license conditions, if any, and orders of the Department.

"Radiographic exposure device" means any instrument containing a sealed source fastened or contained therein, in which the sealed source or shielding thereof may be moved or otherwise changed from a shielded to an unshielded position for purposes of making a radiographic exposure (i.e., camera).

"Sealed source" (i.e., pill) means any capsule or matrix as defined in 32 Ill. Adm. Code 310.20.

"Shielded position" means the location within the radiographic exposure device or storage container which,

by manufacturer's design, is the proper location for storage of the sealed source.

"Shielded-room radiography" means industrial radiography conducted in a room so shielded that doses to individual members of the public at every location on the exterior meet the limitations as specified in 32 Ill. Adm. Code 340.310(a) (i.e., bay, bunker, cell).

"Source assembly" means a component to which the sealed source is affixed or in which the sealed source is contained. The source assembly includes the sealed source (i.e., pigtail).

"Source changer" means a device designed and used for replacement of sealed sources in radiographic exposure devices, including those source changers also used for transporting and storage of sealed sources.

"Storage container" means the structure in which sealed sources are secured and stored at a permanent storage location as described in Section 350.4010(c)(5).

"Temporary job site" means any location that is not specifically listed on a radioactive material license or certificate of registration where industrial radiography is performed for 180 days or less during any consecutive 12 months.

"Transport container" means a package that is designed and constructed to provide radiation safety and security when sealed sources are transported and meets all applicable regulations of the U.S. Department of Transportation.

"Underwater radiography" means industrial radiography performed when the radiographic exposure device and related equipment are beneath the surface of water.

(Source: Amended at 19 Ill. Reg. 16591, effective November 27, 1995)

Section 350.40 Exemptions

- a) The following are exempt from the requirements of this Part:
 - 1) Cabinet x-ray systems designed to exclude individuals, except that such systems must satisfy the provisions of Section 350.3050(c), which apply specifically to cabinet x-ray systems; and
 - 2) Lixiscope used in industrial applications.
- b) Devices exempted by subsection (a) above are subject to the requirements of 32 Ill. Adm. Code 320 and 330 and other applicable provisions of 32 Ill. Adm. Code: Chapter II, Subchapters b and d.

(Source: Added at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.50 Receipt, Transfer and Disposal of Sources of Radiation

Each licensee or registrant shall maintain records showing the receipt, transfer and disposal of sources of radiation. These records shall include the date of receipt, transfer or disposal, the name of the individual making the record, the radionuclide, the number of gigabecquerels or curies and the make, model and serial number of each source of radiation and device, as appropriate. Records shall be maintained for Department inspection until the radioactive material license or certificate of registration is terminated.

(Source: Added at 18 Ill. Reg. 7263, effective May 2, 1994)

SUBPART B: EQUIPMENT CONTROL

Section 350.1000 Requirements for Radiography Equipment Using Radiographic Exposure Devices

- a) Equipment used in industrial radiographic operations involving the use of radiographic exposure devices shall meet the following minimum criteria:
 - 1) Each radiographic exposure device and all associated equipment shall meet the requirements specified in American National Standards Institute (ANSI) N432-1980, "Radiological Safety for the Design and Construction of Apparatus for Gamma Radiography," published January 1981, as NBS Handbook 136, exclusive of subsequent amendments or editions. However, equipment used in industrial radiographic operations need not comply with section 8.9.2(c) of the Endurance Test in ANSI N432-1980, if the prototype equipment has been tested using a torque value representative of the torque that an individual using the radiography equipment can realistically exert on the lever or crankshaft of the drive mechanism.
 - 2) Each radiographic exposure device shall have attached to it one or more durable, legible, clearly visible labels bearing the:
 - A) Chemical symbol and mass number of the radionuclide in the device;
 - B) Activity of the sealed source and the date on which this activity was last measured;
 - C) Model and serial number of the sealed source;
 - D) Manufacturer of the sealed source; and
 - E) Licensee's name, address and telephone number.
 - 3) Each radiographic exposure device intended for use as a Type B transport container shall meet the applicable requirements of 32 Ill. Adm. Code 341.
 - 4) Radiographic exposure devices and associated equipment that allow the source to be moved out of the device for routine operation shall meet the following additional requirements:
 - A) The coupling between the source assembly and the control cable shall be designed in such a manner that the source assembly will not become disconnected if cranked outside the guide tube. The coupling shall be such that it cannot be unintentionally disconnected under normal conditions.
 - B) The device shall automatically secure the source assembly when it is cranked back into the shielded position within the device. This securing system shall only be released by means of a deliberate operation of the exposure device.
 - C) The outlet fittings, lock box and drive cable fittings on each radiographic exposure device shall be equipped with safety plugs or covers, which shall be installed during storage and transportation, to protect the source assembly from water, mud, sand or other foreign matter.
 - D) Each sealed source or source assembly shall have attached to it, or engraved in it, a durable, legible, visible label with the words:

"DANGER-RADIOACTIVE." The label shall not interfere with the safe operation of the exposure device or associated equipment.

- E) The guide tube shall have passed a kinking test that closely approximates the kinking forces likely to be encountered during use and the crushing tests for the control units specified in ANSI N432-1980, "Radiological Safety for the Design and Construction of Apparatus for Gamma Radiography," published January 1981, as NBS Handbook 136, exclusive of subsequent amendments or editions.
 - F) Use of a guide tube shall be necessary to move the source out of the device.
 - G) An exposure head, endcap or similar device designed to prevent the source assembly from extending beyond the end of the guide tube shall be attached to the outermost end of the guide tube during radiographic operations.
 - H) The guide tube exposure head connection shall be able to withstand the tensile test for control units specified in ANSI N432-1980, "Radiological Safety for the Design and Construction of Apparatus for Gamma Radiography," published January 1981, as NBS Handbook 136, exclusive of subsequent amendments or editions.
 - I) Source changers shall provide a system for assuring that the source will not be accidentally withdrawn from the changer when connecting or disconnecting the drive cable to or from a source assembly.
- b) Modification of any radiographic exposure device and associated equipment is prohibited unless the Department, the U.S. Nuclear Regulatory Commission or an Agreement State has determined that the design of any replacement component, including source holder, source assembly, control or guide tube would not compromise the design safety features of the system.
 - c) All radiographic exposure devices and associated equipment manufactured after July 1, 1994, and acquired by licensees shall comply with the requirements of this Section.
 - d) All radiographic exposure devices and associated equipment in use after January 10, 1996, shall comply with the requirements of this Section.
 - e) Each radiographic exposure device, source changer and storage container shall be provided with a lock or lockable outer container designed to prevent unauthorized or accidental removal or exposure of a sealed source.
 - f) Each radiographic exposure device and each transport container shall bear a permanent, durable, legible, clearly visible marking or label(s) which has, as a minimum, the standard radiation caution symbol, depicted in 32 Ill. Adm. Code 340.Illustration A, and the following wording:

CAUTION (OR DANGER)
 RADIOACTIVE MATERIAL--DO NOT HANDLE
 NOTIFY CIVIL AUTHORITIES (OR NAME OF COMPANY)

In addition, transport containers shall meet the applicable requirements of 32 Ill. Adm. Code 341.

(Source: Amended at 19 Ill. Reg. 16591, effective November 27, 1995)

Section 350.1005 Requirements for Radiography Equipment Using Radiation Machines

The control panel of each radiation machine used in industrial radiographic operation shall be equipped with:

- a) A locking device to prevent the unauthorized use of the x-ray system or the accidental production of x-rays; and
- b) A device that will give a positive indication of the production of x-rays whenever the radiation machine is energized.

(Source: Added at 18 Ill. Reg. 7263, effective May 2, 1994)

SUBPART B: EQUIPMENT CONTROL

Section 350.1010 Limits on Levels of Radiation for Radiographic Exposure Devices, Source Changers and Transport Containers

- a) Radiographic exposure devices and source changers manufactured prior to July 1, 1994, shall not be used for industrial radiography unless they meet the following minimum criteria:
 - 1) Radiographic exposure devices and source changers measuring less than 10 centimeters (4 inches) from the sealed source storage position to any exterior surface of the device shall have no radiation level in excess of 12.9 micro C/kg (50 mR) per hour at 15 centimeters (6 inches) from any exterior surface of the device.
 - 2) Radiographic exposure devices and source changers measuring a minimum of 10 centimeters (4 inches) from the sealed source storage position to any exterior surface of the device, and all storage containers for sealed sources or outer containers for radiographic exposure devices, shall not have radiation levels in excess of 51.6 micro C/kg (200 mR) per hour at any exterior surface, and 2.58 micro C/kg (10 mR) per hour at 1 meter (39.4 inches) from any exterior surface.
 - 3) The radiation levels specified in subsections (1) and (2) above shall be determined with the sealed source in the shielded position (i.e., "off").
- b) Radiographic exposure devices, source changers and transport containers manufactured on or after July 1, 1994, shall meet the limits on radiation levels specified in ANSI N432-1980, "Radiological Safety for the Design and Construction of Apparatus for Gamma Radiography," published January 1981, as NBS Handbook 136, exclusive of subsequent amendments or editions.

(Source: Amended at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.1020 Locking of Sources of Radiation

- a) Each radiographic exposure device, source changer and storage container shall be kept locked at all times except when under the direct surveillance of a radiographer or radiographer trainee, or as authorized pursuant to Section 350.3010.
- b) Each radiographic exposure device and source changer shall be locked and the key removed from any keyed lock prior to being moved or transported and also prior to being stored at a given location.
- c) Each sealed source shall be secured in its shielded position by locking the radiographic exposure device or source changer each time the sealed source is returned to its shielded position.

- d) Radiation machines shall be locked and the key removed at all times except when under the direct surveillance of a radiographer or a radiographer trainee or as may be otherwise authorized pursuant to Section 350.3010.

(Source: Amended at 19 Ill. Reg. 8250, effective June 12, 1995)

Section 350.1030 Permanent Storage Precautions

Locked radiographic exposure devices, source changers, storage containers, transport containers that contain sealed sources and radiation machines shall be secured to prevent tampering or removal by unauthorized personnel.

(Source: Amended at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.1040 Radiation Survey Instruments

- a) The licensee or registrant shall maintain sufficient calibrated and operable radiation survey instruments to make physical radiation surveys as required by this Part and 32 Ill. Adm. Code 340.510(a). Instrumentation required by this Section shall have a range such that 0.516 micro C/kg (2 mR) per hour through 258 micro C/kg (1 R) per hour can be measured.
- b) Each radiation survey instrument shall be calibrated:
 - 1) At energies appropriate for use;
 - 2) At intervals not to exceed 6 months and after each instrument servicing other than battery replacement;
 - 3) Such that accuracy within plus or minus 20 percent can be demonstrated;
 - 4) At two or more widely separated points, other than zero, on each scale, or one point of each scale for digital devices. For instruments without multiple scales, calibration shall be performed at six points equally spaced across the range of 0.516 micro C/kg (2 mR) per hour to 258 micro C/kg (1 R) per hour; and
 - 5) By a person licensed by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State to perform such service.
- c) Records of calibrations shall be maintained for 5 years after the calibration date for inspection by the Department.
- d) Immediately prior to use, a radiation survey instrument shall be checked to ensure that it is operating properly by bringing it near a source of radiation and observing a response. Instruments that fail to respond shall not be used.

(Source: Amended at 19 Ill. Reg. 8250, effective June 12, 1995)

Section 350.1050 Testing for Leakage or Contamination, Repair, Tagging, Opening, Modification and Replacement of Sealed Sources

- a) The licensee shall permit only persons specifically authorized by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State to:
 - 1) Replace any sealed source fastened to or contained in a radiographic device;
 - 2) Test a sealed source for leakage or contamination; or
 - 3) Repair, tag, open or modify any sealed source.
- b) An applicant that desires to conduct its own tests for leakage or contamination shall establish procedures to be followed when testing sealed sources for leakage or contamination and shall submit a description of such

procedures to the Department for approval. The description shall include the:

- 1) Instrumentation to be used;
 - 2) Method of performing the test; and
 - 3) Pertinent experience of the individual(s) who will perform the test.
- c) Each sealed source shall be tested for leakage or contamination in accordance with 32 Ill. Adm. Code 340.410. In the absence of a certificate from a transferor indicating that a test has been made within the 6-month period prior to the transfer, the sealed source shall not be put into use until tested and the test results confirm that the sealed source is not leaking or contaminated.
 - d) An acceptable leak test for sealed sources in the possession of a radiography licensee would be to test at the nearest accessible point to the sealed source storage position, or other appropriate measuring point, by a procedure approved pursuant to subsection (b) above. Records of tests for leakage or contamination shall be kept in accordance with 32 Ill. Adm. Code 340.1135.
 - e) If in accordance with 32 Ill. Adm. Code 340.410 a sealed source is determined to be leaking or contaminated, the licensee shall immediately withdraw the equipment involved from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with 32 Ill. Adm. Code 340. Within 5 days after obtaining results of a test showing a sealed source to be leaking or contaminated, the licensee shall file a report with the Department in accordance with 32 Ill. Adm. Code 340.1260.
 - f) A sealed source that is not fastened to or contained in a radiographic exposure device shall have permanently attached to it a durable tag at least 2.54 centimeters (1 inch) square bearing the prescribed radiation caution symbol in conventional colors, magenta or purple on a yellow background, and at least the instructions:

DANGER RADIOACTIVE MATERIAL DO NOT HANDLE NOTIFY CIVIL AUTHORITIES IF FOUND

(Source: Amended at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.1060 Quarterly Inventory

Each licensee or registrant shall conduct a physical inventory at intervals not to exceed 3 months to account for all sources of radiation it has received or possesses. The inventory shall cover all sources or radiation not exempted by Section 350.40, including, but not limited to, sealed sources, radiation machines and radiographic exposure devices containing depleted uranium. The records of the inventories shall be maintained for 5 years from the date of the inventory for inspection by the Department and shall include the manufacturer, model, serial number, radionuclide and number of gigabecquerels or curies, if applicable, location of each source of radiation, date of the inventory and the name of the individual performing the inventory.

(Source: Amended at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.1070 Utilization Logs

Each licensee or registrant shall maintain current logs, which shall be kept available for inspection by the Department for 5 years from the date of the recorded event, showing for each source of radiation the following information:

- a) A unique identifying number or code (e.g., serial number) for each radiation machine, each radiographic exposure device and each sealed source;
- b) The name of the radiographer using the source of radiation;

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- c) The locations where used and dates each source of radiation is removed from storage and returned to storage; and
- d) For radiation machines used in permanent radiographic installations, the date(s) each radiation machine is energized.

(Source: Amended at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.1080 Inspection and Maintenance

- a) Each licensee or registrant shall ensure that checks for obvious defects in radiation machines, radiographic exposure devices, transport containers, source changers, source guide tubes and crank-out devices are performed at the beginning of each day of use.
- b) Each licensee or registrant shall conduct a program of at least quarterly inspection and maintenance of radiation machines, radiographic exposure devices, transport containers and source changers to assure proper functioning of components listed in Section 350. Appendix B. All appropriate parts shall be maintained in accordance with manufacturer's specifications. Records of inspection and maintenance shall be maintained for inspection by the Department for 5 years.
- c) If any inspection conducted pursuant to subsection (a) or (b) above reveals damage to components listed in Section 350. Appendix B, the device shall be labeled as defective and shall be removed from service until repairs have been made.

(Source: Amended at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.1090 Permanent Radiographic Installations

Permanent radiographic installation using a radiographic exposure device(s) having high radiation area entrance controls of the type described in 32 Ill. Adm. Code 340.610(a)(2), 340.610(a)(3) and 340.610(b) shall also meet the following requirements:

- a) Each entrance that is used for personnel access to the high radiation area shall have both visible and audible warning signals to warn of the presence of radiation. The visible signal shall be activated by radiation. The audible signal shall be activated when an attempt is made to enter the installation while the source is exposed.
- b) The entrance control device or alarm system shall be tested for proper operation prior to beginning operations on each day of use. The radiography system shall not be used if any entrance control device or alarm system is operating improperly. If an entrance control device or alarm system is operating improperly, it shall be labeled as defective immediately and repaired. Before the radiography system is returned to service, the radiation safety officer shall retest the entrance control device or alarm system and approve the repair.
- c) Records of tests performed pursuant to subsection (b) above shall be maintained for inspection by the Department for 5 years.

(Source: Amended at 18 Ill. Reg. 7263, effective May 2, 1994)

SUBPART C: PERSONAL RADIATION SAFETY REQUIREMENTS FOR RADIOGRAPHERS AND RADIOGRAPHER TRAINEES

Section 350.2010 Training and Testing

- a) The licensee or registrant shall not permit any individual to act as a radiographer, as defined in this Part, until such individual:
 - 1) Has been certified by the Department pursuant to 32 Ill. Adm. Code 405.90(a) or (c) for the class of radiography (i.e., radioactive materials, radiation machines, or both) that the licensee or registrant is authorized to perform and such certification has neither expired nor been suspended or revoked by the Department;
 - 2) Has received copies of this Part, 32 Ill. Adm. Code 340 and 400, a copy of the license or certificate of registration issued to the licensee or registrant and copies of and instructions in the licensee's or registrant's operating and emergency procedures;
 - 3) Has been instructed in the use of the licensee's or registrant's sources of radiation, radiographic exposure devices, related handling tools and radiation survey instruments; and
 - 4) Has demonstrated, to the satisfaction of the licensee or registrant, an understanding of the instructions provided pursuant to subsections (a)(2) and (3) above as evidenced by having successfully completed a written test and a field examination.
- b) The licensee or registrant shall not permit any individual to act as a radiographer trainee, as defined in this Part, until such individual:
 - 1) Has been certified by the Department pursuant to 32 Ill. Adm. Code 405.90(b) for the class of radiography (i.e., radioactive materials, radiation machines, or both) that the licensee or registrant is authorized to perform and such certification has neither expired nor been suspended or revoked by the Department; and
 - 2) Has met the requirements of subsections (a)(2) through (a)(4) above.
- c) Records of the above training, including copies of written tests and dates of oral tests and field examinations, shall be maintained for inspection by the Department for 3 years following termination of employment or until the radioactive material license or certificate of registration is terminated.
- d) Each licensee or registrant shall conduct an internal audit program to ensure that the Department's radioactive material license conditions and the licensee's or registrant's operating and emergency procedures are followed by each radiographer and radiographer trainee. The licensee or registrant shall audit the job performance of each radiographer and radiographer trainee. The internal audit program shall:
 - 1) Include observation by the licensee or registrant of the job performance of each radiographer and radiographer trainee during an actual industrial radiographic operation at intervals not to exceed 12 months.
 - 2) Provide that, if a radiographer or a radiographer trainee has not participated in an industrial radiographic operation for more than 6 months since the last audit, the individual's job performance shall be observed and recorded by the licensee or registrant when the individual next participates in an industrial radiographic operation.
- e) Records of these audits shall be maintained for inspection by the Department for 5 years from the date of the audit.

(Source: Amended at 19 Ill. Reg. 8250, effective June 12, 1995)

Section 350.2020 Operating and Emergency Procedures

The licensee's or registrant's operating and emergency procedures shall include instructions in at least the following:

- a) Handling and use of sources of radiation to be employed such that no individual is likely to be exposed to radiation doses in excess of the limits established in 32 Ill. Adm. Code 340;
- b) Methods and occasions for conducting radiation surveys;
- c) Methods for controlling access to radiographic areas;
- d) Methods and occasions for locking and securing sources of radiation;
- e) Personnel monitoring and the use of individual monitoring devices, including steps that shall be taken immediately by radiographic personnel in the event that an ionization chamber (i.e., pocket dosimeter) is found to be off-scale;
- f) Transportation to field locations, including packing of sources of radiation in the vehicles, placarding of vehicles and control of sources of radiation during transportation;
- g) Methods or procedures for minimizing exposure of individuals in the event of an accident, including procedures to follow in the event of a disconnect accident, a transportation accident and loss of a sealed source;
- h) The procedure for notifying proper personnel in the event of an accident or loss of a sealed source;
- i) Maintenance of records (see Section 350. Appendix C); and
- j) The inspection and maintenance of radiographic exposure devices, source changers, storage containers, transport containers, source guide tubes, crank-out devices and radiation machines.

(Source: Amended at 18 Ill. Reg. 7263, effective 1 May 2, 1994)

Section 350.2030 Personnel Monitoring Control

- a) The licensee or registrant shall not permit any individual to act as a radiographer or as a radiographer trainee unless, at all times during radiographic operations, each such individual wears a direct reading pocket ionization chamber (i.e., pocket dosimeter) and either a film badge or a thermoluminescent dosimeter (TLD). Each film badge or TLD shall be assigned to and worn by only one individual.
- b) Pocket ionization chambers (i.e., pocket dosimeters) shall meet the criteria in ANSI N13.5-1972, "Performance Specifications for Direct Reading and Indirect Reading Pocket Dosimeters for X- and Gamma Radiation" published 1972, exclusive of subsequent amendments or editions.
- c) The use of pocket ionization chambers (i.e., pocket dosimeters) is subject to the following requirements:
 - 1) Pocket ionization chambers shall be recharged at least daily or at least at the start of each work shift;
 - 2) Pocket ionization chambers shall be read and exposures recorded at least at the beginning and end of each worker's shift involving the use of a source of radiation;
 - 3) Pocket ionization chambers shall be checked for correct response to radiation at periods not to exceed 1 year. Acceptable dosimeters shall read within plus or minus 30 percent of the true radiation exposure. Records of pocket ionization chamber (i.e., pocket dosimeter) calibrations shall be maintained for inspection by the Department for 5 years; and
 - 4) If an individual's pocket ionization chamber is discharged beyond its range (i.e., goes "off-scale"), industrial radiographic operations by that individual

shall cease immediately and the individual's film badge or TLD shall be sent immediately for processing. The individual shall not use sources of radiation until the individual's radiation dose has been determined.

- d) Reports received from the film badge or TLD processor and records of daily pocket ionization chamber (i.e., pocket dosimeter) readings shall be kept for inspection by the Department until the radioactive material license or certificate of registration is terminated or until the Department authorizes their disposition, in writing, following a determination by the Department that the records contain inaccurate personnel monitoring information.
- e) In addition to other requirements of this Section, each individual performing radiography with sealed sources at a location other than a permanent radiography installation shall wear an alarm ratemeter. Each alarm ratemeter shall:
 - 1) Be checked prior to use at the start of each shift to ensure that the alarm functions properly (sounds);
 - 2) Be set to give an alarm signal at a preset dose rate of 5mSv (500 mrem) per hour or less;
 - 3) Require special means to change the preset alarm function; and
 - 4) Be calibrated, at periods not to exceed 1 year, for correct response to radiation. Ratemeters shall alarm within plus or minus 20 percent of the true radiation dose rate. Records of alarm ratemeter calibrations shall be maintained for inspection by the Department for 5 years.
- f) The alarm ratemeter shall be used in addition to, and not as a substitute for, the portable survey instrument required by Section 350.3030. The alarm ratemeter is intended to provide additional assurance that the radiation exposure levels are within regulatory limits.

(Source: Amended at 19 Ill. Reg. 8250, effective June 12, 1995)

Section 350.2040 Supervision of Radiographer Trainees

Except when under the personal supervision of a radiographer, a radiographer trainee shall not use radiographic exposure devices, sealed sources, or related source handling tools, or conduct radiation surveys required by Sections 350.3030(b) and 350.3030(c) to determine that the sealed source has returned to the shielded position after an exposure.

(Source: Amended at 19 Ill. Reg. 8250, effective June 12, 1995)

**SUBPART D: PRECAUTIONARY PROCEDURES
IN RADIOGRAPHIC OPERATIONS****Section 350.3010 Access Control and Security**

- a) During each radiographic operation, the radiographer or radiographer trainee shall maintain a direct surveillance of the operation to protect against unauthorized entry into a high radiation area, as defined in 32 Ill. Adm. Code 310, except:
 - 1) Where the high radiation area is equipped with a control device or alarm system as described in 32 Ill. Adm. Code 340.610(a), or
 - 2) Where the high radiation area is locked to protect against unauthorized or accidental entry.
- b) Sources of radiation shall not be left unattended except when secured against unauthorized use, access or removal.

(Source: Amended at 19 Ill. Reg. 8250, effective 8250)

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Section 350.3020 Posting

Notwithstanding any provisions in 32 Ill. Adm. Code 340.930(a), areas in which radiography is being performed shall be conspicuously posted as follows:

- a) Each high radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

CAUTION (OR DANGER)
HIGH RADIATION AREA

- b) Each radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the wording required in subsection (a) above, or the words:

CAUTION (OR DANGER)
RADIATION AREA

- c) Whenever practicable, ropes or barriers shall be used in addition to appropriate signs to designate radiation areas and to help prevent unauthorized entry.
- d) Notwithstanding the requirements of 32 Ill. Adm. Code 340.920(a), each radiation area may be posted in accordance with 32 Ill. Adm. Code 340.920(b) (i.e., both signs may be posted at the same location at the boundary of the radiation area).

(Source: Amended at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.3030 Radiation Surveys and Survey Records

- a) No industrial radiographic operation shall be conducted unless at least one calibrated and operable radiation survey instrument, as described in Section 350.1040, is available and used at each site where radiographic exposures are made.
- b) A survey with a radiation survey instrument shall be made after each use of a radiographic exposure device to determine that the sealed source has been returned to its shielded position. The entire circumference of the radiographic exposure device shall be surveyed. If the radiographic exposure device has a source guide tube, the survey shall also include the source guide tube and any attached collimator.
- c) A lock-out survey, in which all accessible surfaces of the radiographic exposure device or source changer are surveyed with a radiation survey instrument, shall be made to determine that each sealed source is in its shielded position prior to securing the radiographic exposure device or source changer as specified in Section 350.1020.
- d) A physical radiation survey shall be made after each radiographic exposure using a radiation machine to determine that the machine is "off".
- e) Radiation surveys shall be performed in areas where industrial radiography operations are to be performed and shall meet the following requirements:
 - 1) Before industrial radiographic operations begin, all radiation areas and high radiation areas (as determined by calculated exposure rates) in which radiographic operations are to be performed shall be posted in accordance with Section 350.3020. An area survey shall be performed during the first radiographic exposure (i.e., with the sealed source in the exposed position) to confirm that the requirements specified in Section 350.3020 have been met and that doses to individual members of

the public do not exceed the limits specified in 32 Ill. Adm. Code 340.310(a).

- 2) The survey required in subsection (1) above shall be repeated each time the exposure device is relocated or the exposed position of the sealed source is changed.
- 3) The requirements specified in subsection (2) above do not apply to repetitive industrial radiographic operations when the conditions or exposure, including, but not limited to, the radiographic exposure device, duration of exposure, source strength, pipe size and pipe thickness, remain constant.
- f) If a vehicle is to be used for storage of radioactive material, a vehicle survey shall be performed after securing radioactive material in the vehicle and before commencement of transport to ensure that doses to individual members of the public do not exceed the limits specified in 32 Ill. Adm. Code 340.310(a) at the exterior surface of the vehicle.
- g) Surveys shall be performed on storage containers to ensure that doses to individual members of the public do not exceed the limits specified in 32 Ill. Adm. Code 340.310(a). These surveys shall be performed initially with the maximum amount of radioactive material present in the storage location and thereafter at the time of the quarterly inventory and whenever storage conditions change.
- h) A survey meeting the requirements of subsection (b) above shall be performed on the radiographic exposure device and the source changer after every sealed source exchange.
- i) Records shall be kept of the surveys required by subsections (c) through (h) above. Such records shall be maintained for inspection by the Department for 5 years after completion of the survey. If the survey was used to determine an individual's exposure, however, the records of the survey shall be maintained until the radioactive material license or certificate of registration is terminated or until the Department authorizes their disposition, in writing, following a determination by the Department that the records contain inaccurate information that could result in an inaccurate determination of an individual's exposure.

(Source: Amended at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.3040 Records Required at Temporary Job Sites

Each licensee or registrant using a source of radiation at a temporary job site shall maintain and have available at the temporary job site, for inspection by the Department, the following records:

- a) The radioactive material license, certificate of registration or equivalent document;
- b) Operating and emergency procedures;
- c) Relevant regulations of the Department;
- d) Survey records required pursuant to Section 350.3030 for the period of operation at the site;
- e) Daily pocket ionization chamber (i.e., pocket dosimeter) records for the period of operation at the site;
- f) If using radioactive material, daily alarm ratemeter records for the period of operation at the site; and
- g) Both the latest instrument calibration records and sealed source leakage or contamination test records for specified devices in use at the site. Acceptable records include tags or labels that are affixed to the device or survey meter and decay charts showing leakage or contamination test results for sources that have been manufactured within the last 6 months.

(Source: Amended at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.3045 Operating Requirements

- a) When radiography is performed at a location other than a permanent radiographic installation, a minimum of two radiographic personnel shall be present to operate the radiographic exposure device. At least one of the radiographic personnel shall be a radiographer. The other radiographic personnel may be either a radiographer or radiographer trainee.
- b) Collimators shall be used in industrial radiographic systems that use crank-out devices except when physically impossible.
- c) Other than a radiographer, or a radiographer trainee who is under the personal supervision of a radiographer, no person shall manipulate controls or operate equipment used in industrial radiographic operations.
- d) At each job site, the following shall be supplied by the licensee or registrant:
 - 1) The appropriate barrier ropes and signs;
 - 2) At least one operable, calibrated survey instrument;
 - 3) A current whole body individual monitoring device (TLD or film badge) for each worker, and
 - 4) An operable, calibrated pocket ionization chamber (i.e., pocket dosimeter) with a range of zero to 51.6 micro C/kg (200 mR) for each worker.
- e) Each worker who performs industrial radiography with a sealed source at a location other than a permanent radiography installation shall have on his or her person an operable, calibrated alarm ratemeter.
- f) Each radiographer or radiographer trainee at a job site shall have on his or her person a valid industrial radiographer certification card issued by the Department pursuant to the provisions of 32 Ill. Adm. Code 405.
- g) Industrial radiographic operations shall not be performed if any of the items in subsections (d), (e) and (f) above are unavailable at the job site or are inoperable.

(Source: Amended at 19 Ill. Reg. 16591, effective November 27, 1995)

Section 350.3048 Notification of Incidents

The licensee or registrant shall notify the Department of stolen lost or missing sources of radiation, overexposure, excessive radiation levels and leakage or contamination of sealed sources in accordance with 32 Ill. Adm. Code 340.1210 through 340.1230 and 340.1260. In addition, each licensee or registrant shall submit a written report within 30 days to the Department whenever one of the following events occurs:

- a) A sealed source cannot be returned to the shielded position and properly secured;
- b) A sealed source becomes disconnected from a drive cable;
- c) Failure of any component necessary for safe operation of a device to properly perform its intended function; or
- d) An indicator on a radiation machine fails to show that radiation is being produced or an exposure switch fails to terminate production of radiation when turned to the "off" position.

(Source: Added at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.3050 Special Requirements and Exemptions for Enclosed Radiography Systems

- a) Except as exempted by subsection (c) below, the following additional requirements apply to enclosed radiography systems, including systems used in shielded-room

radiography. Enclosed radiography systems (including cabinet systems) that are designed to allow admittance of individuals shall be designed and constructed so that:

- 1) All requirements of this Part and of 32 Ill. Adm. Code 340.310(a) and 340.320 are complied with;
 - 2) Each door fastening mechanism will allow the door to be opened from the inside at all times;
 - 3) Visible and audible alarms are installed and are activated immediately prior to each initiation of an exposure; and
 - 4) A reliable interlock or other mechanism is installed at each means of access to the enclosure which will preclude access to an area of radiation hazard either by preventing entry or by automatically reducing the hazard.
- b) Each system for enclosed radiography specified in subsection (a) above shall be evaluated initially by the licensee or registrant and at intervals not to exceed 1 year to assure compliance with the requirements of this Part and 32 Ill. Adm. Code 340.310(a) and 340.320. Records of these evaluations shall be maintained for inspection by the Department for a period of 5 years after the evaluation.
 - c) Cabinet x-ray systems designed to exclude individuals are exempt from the requirements of this Part except that:
 - 1) The registrant shall comply with the requirements of 32 Ill. Adm. Code 320 and 340;
 - 2) The registrant shall not permit any individual to operate a cabinet x-ray system until such individual has been instructed in the operating and emergency procedures for the unit and has demonstrated, to the satisfaction of the registrant, competence in its use;
 - 3) Each cabinet x-ray system shall be manufactured and assembled in conformance with the regulations in 21 CFR 1020.40, published April 1, 1991, exclusive of subsequent amendments or editions.
 - 4) The registrant shall maintain for review by the Department information regarding the operating parameters and workload of each cabinet system; and
 - 5) Tests for proper operation of interlocks installed in accordance with 21 CFR 1020.40 shall be conducted and recorded in accordance with Section 350.1090.

(Source: Amended at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.3060 Special Requirements and Exemptions for Enclosed Radiography Systems, other than those Described in Section 350.3050 that are Designed to Allow Admittance of Individuals (Repealed)

(Source: Repealed at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.3070 Special Requirements and Exemptions for Certified and Non-Certified Cabinet X-Ray Systems Designed to Exclude Individuals (Repealed)

(Source: Repealed at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.3080 Special Requirements for Mobile or Portable Radiation Machines (Repealed)

(Source: Repealed at 18 Ill. Reg. 7263, effective May 2, 1994)

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Section 350.3090 Special Requirements for Underwater and Lay-Barge Radiography

- a) Underwater radiography or lay-barge radiography shall not be performed unless specifically authorized in a radioactive material license issued by the Department, the U.S. Nuclear Regulatory Commission or an Agreement State in accordance with Section 350.4010 or equivalent.
- b) In addition to the other requirements of this Part, the following rules apply to the performance of lay-barge radiography:
 - 1) Cobalt-60 sources with activities in excess of 740 GBq (20 Ci) (nominal) and iridium-192 sources with activities in excess of 3.70 TBq (100 Ci) (nominal) shall not be used in the performance of lay-barge industrial radiography.
 - 2) Collimators shall be used in the performance of lay-barge radiography.

(Source: Added at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.4000 Prohibitions

Retrieval of disconnected sealed sources of radioactive material or sealed sources that cannot be returned by normal means to a shielded position or properly secured shall not be performed unless specifically authorized by a radioactive material license issued by the Department, the U.S. Nuclear Regulatory Commission or an Agreement State.

(Source: Added at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.4010 Licensing and Registration Requirements for Industrial Radiographic Operations

- a) Radioactive material used in industrial radiographic operations shall be licensed in accordance with 32 Ill. Adm. Code 330.
- b) Radiation machines used in industrial radiographic operations shall be registered in accordance with 32 Ill. Adm. Code 320.
AGENCY NOTE: If a licensee does not use radiation machines and uses only radioactive materials, then the licensed activities do not need to be registered in accordance with the requirements of 32 Ill. Adm. Code 320.
- c) In addition to the licensing requirements in 32 Ill. Adm. Code 330, an application for a license shall include the following information:
 - 1) A schedule or description of the program for training radiographic personnel that specifies:
 - A) Initial training;
 - B) Periodic training;
 - C) On-the-job training; and
 - D) Methods to be used by the licensee or registrant to determine the knowledge, understanding and ability of radiographic personnel to comply with Department rules, licensing or registration requirements, and the operating and emergency procedures of the applicant;
 - 2) Written operating and emergency procedures, including all items listed in Section 350.2020;
 - 3) A description of the internal inspection system or other management control to ensure that radiographic personnel comply with license conditions, regulations and orders of the Department and the applicant's operating and emergency procedures;

- 4) A description of the organization of the industrial radiographic program, including delegation of authority and responsibility for operation of the radiation safety program;
- 5) A list of proposed permanent radiographic installations and descriptions of proposed permanent storage and use locations. Radioactive material shall not be stored at a permanent storage location or used at a permanent use location unless such storage or use location is specifically authorized by the license. A storage or use location is permanent if radioactive material is stored or used at the location for more than 180 days during any consecutive 12 months;
- 6) A description of the program for inspection and maintenance of radiographic exposure devices, transport containers and storage containers (including applicable items in Sections 350.1080 and 350. Appendix B);
- 7) For applicants seeking authorization to perform underwater radiography, a description of:
 - A) Radiation safety procedures and radiographer responsibilities unique to the performance of underwater radiography;
 - B) Radiographic equipment and radiation safety equipment unique to underwater radiography; and
 - C) Methods for watertight encapsulation of equipment; and
- 8) For applicants seeking authorization to perform lay-barge radiography, a description of:
 - A) Transport procedures for radioactive material to be used in industrial radiographic operations;
 - B) Storage facilities for radioactive material; and
 - C) Methods for restricting access to radiation areas.

(Source: Amended at 19 Ill. Reg. 16591, effective November 27, 1995)

Section 350.4020 Radiation Safety Officer

- a) Each licensee or registrant performing industrial radiography shall designate a Radiation Safety Officer (RSO).
AGENCY NOTE: The Department will list the name of the RSO on each radioactive material license.
- b) The RSO's qualifications shall include, but not be limited to:
 - 1) Possession of a high school diploma or a certificate of high school equivalency based on the GED test;
 - 2) Completion of the training and testing requirements of Section 350.2010(a)(2), (3) and (4);
 - 3) 2 years of documented experience related to radiation protection, including knowledge of industrial radiographic operations; and
 - 4) For licensees only, the RSO shall also maintain certification as an industrial radiographer as specified in Section 350.2010(a)(1).
- c) The specific duties of the RSO shall include, but need not be limited to, the following:
 - 1) Establish and oversee operating, emergency and ALARA procedures, and review them at least annually to ensure that the procedures are current and conform with 32 Ill. Adm. Code: Chapter II, Subchapters b and d;

- 2) Oversee the radiation protection training program for radiographic personnel;
 - 3) Ensure that required radiation surveys and leak tests are performed and documented in accordance with 32 Ill. Adm. Code: Chapter II, Subchapter b and d;
 - 4) Ensure that corrective measures are taken when levels of radiation exceed established limits;
 - 5) Ensure that individual monitoring devices are calibrated and used properly by industrial radiographic personnel, that records are kept of the monitoring results and that timely notifications are made as required by this Part and 32 Ill. Adm. Code 400;
 - 6) Ensure that required interlock switches and warning signals are functioning and that radiation signs, ropes and barriers are properly posted and positioned;
 - 7) Investigate and report to the Department each known or suspected case of excessive radiation exposure to an individual or radiation level detected in excess of limits established by 32 Ill. Adm. Code: Chapter II, Subchapters b and d and each theft or loss of source(s) of radiation, determine the cause and take steps to prevent recurrence;
 - 8) Assume control and have the authority to institute corrective actions in emergency situations or unsafe conditions;
 - 9) Maintain records as required by 32 Ill. Adm. Code: Chapter II, Subchapters b and d (see Section 350.Appendix C);
 - 10) Ensure proper storage, labeling, transport and use of exposure devices and sources of radiation;
 - 11) Ensure that quarterly inventory and inspection and maintenance programs are performed in accordance with Section 350.1060 and 350.1080; and
 - 12) Ensure that personnel comply with 32 Ill. Adm. Code: Chapter II, Subchapter b and d, the conditions of the license and the operating and emergency procedures of the licensee or registrant.
- d) The licensee or registrant shall ensure that the duties in subsection (c) above are executed.

(Source: Amended at 19 Ill. Reg. 16591, effective November 27, 1995)

Section 350.4030 Reciprocity

The Department shall grant reciprocal recognition of radioactive material licenses in accordance with 32 Ill. Adm. Code 330.900.

(Source: Added at 18 Ill. Reg. 7263, effective May 2, 1994)

Section 350.APPENDIX A Subjects to be Covered During the Instruction of Radiographers (Repealed)

(Source: Repealed at 19 Ill. Reg. 8250, effective June 12, 1995)

Section 350.APPENDIX B General Requirements for Inspection of Industrial Radiographic Equipment

- a) Panoramic devices (devices in which the sealed source is physically removed from the shielded container during exposure) shall be inspected for:
 - 1) Radiographic Exposure Unit
 - A) Abnormal surface radiation levels anywhere on camera, collimator or guide tube;
 - B) Condition of safety plugs;
 - C) Proper operation of locking mechanism;
 - D) Condition of pigtail connector;

- E) Condition of carrying device (e.g., straps, handle, etc.); and
 - F) Proper labeling.
- 2) Source Guide Tube
 - A) Rust, dirt or sludge buildup inside the source tube;
 - B) Condition of source tube connector;
 - C) Condition of source stop;
 - D) Kinks or damage that could prevent proper operation; and
 - E) Presence of radioactive contamination.
 - 3) Control Cables and Drive Mechanism
 - A) Proper drive mechanism with camera, as appropriate;
 - B) Changes in general operating characteristics;
 - C) Conditions of connector on drive cable;
 - D) Drive cable flexibility, wear and rust;
 - E) Excessive wear or damage to crank assembly parts;
 - F) Damage to drive cable conduit that could prevent the cable from moving freely;
 - G) Connection of the control cable connector with the pigtail connector for proper mating;
 - H) Proper operation of source position indicator, if applicable; and
 - I) Presence of radioactive contamination.
- b) Directional beam devices containing radioactive material shall be inspected for:
- 1) Abnormal surface radiation;
 - 2) Changes in the general operating characteristics of the device;
 - 3) Proper operation of shutter mechanism;
 - 4) Chafing or binding of shutter mechanism;
 - 5) Damage to the device which might impair its operation;
 - 6) Proper operation of locking mechanism;
 - 7) Proper drive mechanism with camera, as appropriate;
 - 8) Condition of carrying device (e.g., strap, handle, etc.); and
 - 9) Proper labeling.
- c) X-ray equipment shall be inspected for:
- 1) Change in the general operating characteristics of the device;
 - 2) Wear of electrical cables and connectors;
 - 3) Proper labeling of console;
 - 4) Proper console with machine, as appropriate;
 - 5) Proper operation of locking mechanism;
 - 6) Timer run-down cutoff;
 - 7) Damage to tube head housing that might result in excessive radiation levels; and
 - 8) Positive indication of x-ray production.

Source: Added at 18 Ill. Reg. 7263, effective May 2, 1994)

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Section 350.APPENDIX C Retention Requirements for Records

<u>Specific Section</u>	<u>Name of Record</u>	<u>Record Retention Period</u>
350.50	Receipt, Transfer and Disposal	Until the radioactive material license or certificate of registration is terminated
350.1040(c)	Survey Instrument Calibration	5 years
350.1050(c)	Leakage or Contamination Tests	5 years
350.1060	Quarterly Inventory	5 years
350.1070	Utilization Logs	5 years
350.1080	Quarterly Inspection and Maintenance	5 years
350.1090	High Radiation Area Control Devices or Alarm Systems	5 years
350.2010(c)	Training and Testing Records	Until the radioactive material license or certificate of registration is terminated. 3 years after termination of employment
350.2010(d)	Internal Audit Program	5 years
350.2030(c)	Pocket Ionization Chamber (i.e., Pocket Dosimeter) Calibrations	5 years
350.2030(d)	Personnel Monitoring Records Pocket Ionization Chamber (i.e., Pocket Dosimeter) Readings	Until the radioactive material license or certificate of registration is terminated
350.2030(e)(4)	Alarm Ratemeter Calibrations	5 years
350.3030	Radiation Surveys	5 years or until the radioactive material license or certificate of registration is terminated if a survey was used to determine an individual's exposure
350.3040	Records at Temporary Job Sites	During temporary job site operations
350.3050	Initial and Annual Evaluations of Enclosed Radiography Systems	5 years

(Source: Added at 18 Ill. Reg. 7263, effective May 2, 1994)

TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

PART 351
RADIATION SAFETY REQUIREMENTS FOR
WIRELINE SERVICE OPERATIONS AND
SUBSURFACE TRACER STUDIES

Section	Purpose
351.10	Purpose
351.20	Scope
351.25	Incorporations by Reference
351.30	Definitions
351.40	Prohibition
351.1010	Limits on Levels of Radiation
351.1020	Storage Precautions
351.1030	Transport Precautions
351.1040	Radiation Survey Instruments
351.1050	Testing for Leakage or Contamination of Sealed Sources
351.1060	Quarterly Inventory
351.1070	Utilization Records
351.1080	Design and Performance Criteria for Sealed Sources Used in Downhole Operations
351.1090	Labeling
351.1100	Inspection and Maintenance
351.2010	Training Requirements
351.2020	Operating and Emergency Procedures
351.2030	Personnel Monitoring
351.3010	Security
351.3020	Handling Tools
351.3030	Subsurface Tracer Studies
351.3040	Particle Accelerators
351.4010	Radiation Surveys
351.4020	Documents and Records Required at Field Stations
351.4030	Documents and Records Required at Temporary Jobsites
351.5010	Notification of Incidents, Abandonment and Lost Sources
APPENDIX A Subjects To Be Included In Training Courses For Logging Supervisors	
APPENDIX B Example of Plaque for Identifying Wells Containing Sealed Sources Containing Radioactive Material Abandoned Downhole	

AUTHORITY: Implementing and authorized by Sections 9 and 11 of the Radiation Protection Act of 1990 (Ill. Rev. Stat. 1991, ch. 111 1/2, pars. 210-9 and 210-11) 420 ILCS 40/9 and 11 and Section 5 of the Personnel Radiation Monitoring Act (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 230.15) 420 ILCS 25/5.

SOURCE: Adopted at 10 Ill. Reg. 17507, effective September 25, 1986; amended at 11 Ill. Reg. 5215, effective March 13, 1987; amended at 13 Ill. Reg. 13605, effective August 11, 1989; amended at 14 Ill. Reg. 13633, effective August 13, 1990; amended at 18 Ill. Reg. 3344, effective February 22, 1994.

Section 351.10 Purpose

This Part establishes radiation safety requirements for individuals using sources of radiation for wireline service operations, including mineral logging, radioactive markers and subsurface tracer studies. The requirements of this Part are in addition to, and not in substitution for, the requirements of 32 Ill. Adm. Code: Chapter II, Subchapters b and d.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.20 Scope

The regulations in this Part apply to all licensees or registrants who use sources of radiation for wireline service operations, including mineral logging, radioactive markers, or subsurface tracer studies.

Section 351.25 Incorporations by Reference

All rules, standards and guidelines of agencies of the United States or nationally recognized organizations or associations that are incorporated by reference in this Part are incorporated as of the date specified in the reference and do not include any later amendments or editions. Copies of these rules, standards and guidelines that have been incorporated by reference are available for public inspection at the Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, Illinois.

(Source: Added at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.30 Definitions

As used in this Part, the following definitions apply:

"Field station" means a facility where radiation sources may be stored or used and from which equipment is dispatched to temporary jobsites.

"Irretrievable well-logging source" means any sealed source containing radioactive material that is pulled off or not connected to the wireline that suspends the source in the well and for which all reasonable effort at recovery has been expended.

"Injection tool" means a device used for controlled subsurface injection of radioactive tracer material.

"Logging supervisor" means the individual who provides personal supervision of the utilization of sources of radiation at the well site.

"Logging tool" means a device used subsurface to perform well-logging.

"Mineral logging" means any logging performed for the purpose of mineral exploration other than oil or gas.

"Personal supervision" means guidance and instruction by the supervisor who is physically present at the jobsite and watching the performance of the operation in such proximity that visual contact can be maintained and immediate assistance given as required.

"Radioactive marker" means radioactive material placed subsurface or on a structure intended for subsurface use for the purpose of depth determination or direction orientation.

"Source holder" means a housing or assembly into which a radioactive source is placed for the purpose of facilitating the handling and use of the source in well-logging operations.

"Subsurface tracer study" means the release of a substance tagged with radioactive material for the purpose of tracing

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the movement or position of the tagged substance in the well-bore or adjacent formation.

"Temporary jobsite" means a location to which radioactive materials have been dispatched to perform wireline service operations or subsurface tracer studies.

"Well-bore" means a drilled hole in which wireline service operations and subsurface tracer studies are performed.

"Well-logging" means the lowering and raising of measuring devices or tools which may contain sources of radiation into well-bores or cavities for the purpose of obtaining information about the well and/or adjacent formations.

"Wireline" means a cable containing one or more electrical conductors which is used to lower and raise logging tools in the well-bore.

"Wireline service operation" means any evaluation or mechanical service which is performed in the well-bore using devices on a wireline.

Section 351.40 Prohibition

No licensee or registrant shall perform wireline service operations with a sealed source(s) unless, prior to commencement of the operation, the licensee has a written agreement with the well operator, well owner, drilling contractor or land owner that:

- a) In the event a sealed source is lodged downhole, efforts at recovery will be made that are commensurate with the circumstances of the specific case, e.g., quantity and half-life of the isotope, depth of the source and presence of potable water aquifers; and
- b) In the event a decision is made to abandon the sealed source downhole, the requirements of Section 351.5010(c) shall be met within 30 days after a decision by the licensee to abandon the source has been approved by the Department of Nuclear Safety (Department).

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.1010 Limits on Levels of Radiation

Sources of radiation shall be used, stored and transported in such a manner that the transportation requirements of 32 Ill. Adm. Code 341 and the dose limitation requirements of 32 Ill. Adm. Code 340 are met.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.1020 Storage Precautions

- a) Each source of radiation, except accelerators, shall be provided with a storage and/or transport container. The container shall be provided with a lock, or tamper seal for calibration sources, to prevent unauthorized removal of, or exposure to, the source of radiation.
- b) When in storage, sources of radiation shall be isolated from flammable or explosive substances.

Section 351.1030 Transport Precautions

Transport containers shall be physically secured to the transporting vehicle to prevent accidental loss, tampering, or unauthorized removal.

Section 351.1040 Radiation Survey Instruments

- a) The licensee or registrant shall maintain sufficient calibrated and operable radiation survey instruments at each field station to make physical radiation surveys as required by this Part and by 32 Ill. Adm. Code 340.510(a). Instrumentation shall be capable of measuring 25.8 nC/kg (100 microR) per hour through at least 5.16 microC/kg (20 mR) per hour.
- b) Each radiation survey instrument shall be calibrated:
 - 1) At intervals not to exceed 6 months and after each instrument servicing (e.g., electronic repair);
 - 2) At energies and radiation levels equivalent to those to be encountered during use; and
 - 3) So that accuracy within plus or minus 20 percent of the true radiation level can be demonstrated on each scale.
- c) Calibration records shall be maintained for a period of 2 years for inspection by the Department.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.1050 Testing for Leakage or Contamination of Sealed Sources

Testing for leakage or contamination of sealed sources shall be performed in accordance with 32 Ill. Adm. Code 340.410. Test samples shall be taken from the surfaces of sources or source holders or from the surfaces of devices in which sources are mounted and on which one might expect contamination to accumulate.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.1060 Quarterly Inventory

Each licensee or registrant shall conduct a quarterly physical inventory to account for all sources of radiation. If all sources are not accounted for during the inventory, the licensee or registrant shall notify the Department in accordance with the requirements of 32 Ill. Adm. Code 340.1210. Records of inventories shall be maintained for 2 years from the date of inventory for inspection by the Department and shall include the quantities and kinds of sources of radiation, the location where sources of radiation are assigned, the date of the inventory and the name of the individual conducting the inventory.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.1070 Utilization Records

Each licensee or registrant shall maintain current records, which shall be kept available for inspection by the Department for 2 years from the date of the recorded event, showing the following information for each source of radiation:

- a) Make, model number and a serial number or a description of each source of radiation used;
- b) The identity of the well-logging supervisor or field unit to whom assigned;
- c) Locations where used and dates of use; and
- d) In the case of tracer materials and radioactive markers, the utilization record shall indicate the radionuclide and activity used in a particular well.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.1080 Design and Performance Criteria for Sealed Sources Used in Downhole Operations

- a) A licensee may not use a sealed source in well-logging unless:
- 1) The sealed source is doubly encapsulated;
 - 2) The sealed source contains radioactive material whose chemical and physical forms are insoluble and non-dispersible; and
 - 3) A prototype of the sealed source has been tested and meets the performance standards for oil well-logging sources contained in either the United States of America Standards Institute (USASI) Standard No. N5.10-1968 or the American National Standards Institute (ANSI) Standard No. N542-1977 (1978 edition), exclusive of subsequent amendments or editions.
- b) The requirements of subsection (a) above do not apply to sealed sources that contain licensed material in gaseous form.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.1090 Labeling

- a) Sources, Source Holders or Logging Tools
- 1) Each source, source holder or logging tool containing radioactive material shall bear a durable, legible and clearly visible marking or label which has, as a minimum, the standard radiation caution symbol (as described in 32 Ill. Adm. Code 340.910), without the conventional color requirement and the following wording:

DANGER* RADIOACTIVE

*AGENCY NOTE: or CAUTION.

- 2) This labeling shall be on every component transported as a separate piece of equipment.
- b) Transport Containers. Each transport container shall have permanently attached to it a durable, legible and clearly visible label which has, as a minimum, the standard radiation caution symbol (as described in 32 Ill. Adm. Code 340.910) and the following wording:

DANGER* RADIOACTIVE NOTIFY CIVIL AUTHORITIES (OR NAME OF COMPANY)

*AGENCY NOTE: or CAUTION.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.1100 Inspection and Maintenance

- a) Each licensee or registrant shall conduct, at intervals not to exceed 6 months, a program of inspection and maintenance of source holders, logging tools, source handling tools, storage containers, transport containers and injection tools to assure proper labeling and physical condition. Records of inspection and maintenance shall be maintained for a period of 2 years for inspection by the Department.
- b) If any inspection conducted pursuant to subsection (a) above reveals damage to labeling or components which could result in release of radioactive material into the environment, or loss of control of radioactive material, or which could otherwise create a risk of increase in radiation exposure, the device shall be removed from service until repairs have been made.
- c) The repair, opening or modification of any sealed source shall be performed only by persons specifically authorized

to do so by the Department, the U.S. Nuclear Regulatory Commission, an Agreement State or a Licensing State.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.2010 Training Requirements

- a) No licensee or registrant shall permit any individual to act as a logging supervisor as defined in this Part until such individual has:
- 1) Received 40 hours of instruction in the subjects outlined in Section 351. Appendix A and has demonstrated to the satisfaction of the licensee or registrant an understanding thereof by successful completion of a written examination administered by the licensee or registrant;
 - 2) Read and received instruction in the regulations contained in this Part and the applicable Sections of 32 Ill. Adm. Code 310, 340 and 400 or the equivalent state or federal regulations, conditions of appropriate license or certificate of registration, and the licensee's or registrant's operating and emergency procedures and demonstrated to the satisfaction of the licensee or registrant an understanding thereof; and
 - 3) Demonstrated to the satisfaction of the licensee or registrant competence to use sources of radiation, related handling tools and radiation survey instruments which will be used on the job.
- b) No licensee or registrant shall permit any individual to assist in the handling of sources of radiation until such individual has:
- 1) Read or received instruction in the licensee's or registrant's operating and emergency procedures and demonstrated to the satisfaction of the licensee or registrant an understanding thereof; and
 - 2) Demonstrated to the satisfaction of the licensee or registrant competence to use, under the personal supervision of the logging supervisor, the sources of radiation, related handling tools and radiation survey instruments which will be used on the job.
- c) The licensee or registrant shall maintain employee training records for inspection by the Department for 2 years following termination of employment.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.2020 Operating and Emergency Procedures

The licensee's or registrant's operating and emergency procedures shall include instructions in at least the following:

- a) Handling and use of sources of radiation to be employed so that no individual is likely to be exposed to radiation doses in excess of the standards established in 32 Ill. Adm. Code 340;
- b) Methods and occasions for conducting radiation surveys;
- c) Methods and occasions for locking and securing sources of radiation;
- d) Personnel monitoring and the use of personnel monitoring equipment;
- e) Transportation to temporary jobsites and field stations, including the packaging and placing of sources of radiation in vehicles, placarding of vehicles and securing sources of radiation during transportation;
- f) Minimizing exposure of individuals in the event of an accident;

- g) Procedure for notifying proper personnel in the event of an accident;
- h) Maintenance of records;
- i) Inspection and maintenance of source holders, logging tools, source handling tools, storage containers, transport containers and injection tools;
- j) Procedure to be followed in the event a sealed source is lodged downhole; and
- k) Procedures to be used for picking up, receiving and opening packages containing radioactive material.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.2030 Personnel Monitoring

- a) No licensee or registrant shall permit any individual to act as a logging supervisor or to assist in the handling of sources of radiation unless each such individual wears either a film badge or a thermoluminescent dosimeter (TLD). Each film badge or TLD shall be assigned to and worn by only one individual.
- b) Records of individual monitoring results shall be retained in accordance with 32 Ill. Adm. Code 340.1160.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.3010 Security

During each logging or tracer application, the logging supervisor or other designated employee shall maintain direct surveillance of the operation to protect against unauthorized and/or unnecessary entry into a restricted area, as defined in 32 Ill. Adm. Code 310.

Section 351.3020 Handling Tools

The licensee or registrant shall provide and require the use of tools that will assure remote handling of sealed sources other than low-activity calibration sources.

Section 351.3030 Subsurface Tracer Studies

- a) All personnel handling radioactive tracer material shall be required to use protective gloves, protective clothing and equipment which prevents the spread of contamination. Precautions shall be taken by the licensee or registrant to prevent ingestion or inhalation of radioactive material.
- b) No licensee or registrant shall cause the injection of radioactive material into potable aquifers without specific license authorization issued by the Department pursuant to 32 Ill. Adm. Code 330.250. Such authorization will be issued only if:
 - 1) The applicant's proposed procedures will prevent tracer concentrations at the most exposed drinking water source or public water supply inlet from exceeding the Illinois Environmental Protection Agency's drinking water quality standards in 35 Ill. Adm. Code 604; and
 - 2) The applicant's proposed procedures will be performed:
 - A) on an underground injection well for which a U.S. Environmental Protection Agency underground injection control program permit has been issued pursuant to 40 CFR 124 or 40 CFR 144 revised as of July 1, 1990, or pursuant to 35 Ill. Adm. Code 705 or 62 Ill. Adm. Code 240; or

- B) On a well for which the Illinois Environmental Protection Agency has otherwise approved a subsurface radioactive tracer study pursuant to 35 Ill. Adm. Code 704; or
- C) On a well for which the Illinois Department of Mines and Minerals has otherwise approved a subsurface radioactive tracer study pursuant to 62 Ill. Adm. Code 240.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.3040 Particle Accelerators

No licensee or registrant shall permit above-ground testing of particle accelerators, designed for use in well-logging, which results in the production of radiation, except in areas or facilities controlled or shielded so that the requirements of 32 Ill. Adm. Code 340.210 and 340.310, as applicable, are met.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.4010 Radiation Surveys

- a) Radiation surveys and/or calculations shall be made and recorded for each area where radioactive materials are stored.
- b) Radiation surveys and/or calculations shall be made and recorded for the radiation levels in occupied positions and on the exterior of each vehicle used to transport radioactive material. Such surveys and/or calculations shall include each source of radiation or combination of sources to be transported in the vehicle.
- c) After removal of the sealed source from the logging tool and before departing the jobsite, the logging tool detector shall be energized, or a radiation survey meter used, to assure that the logging tool is free of contamination.
- d) Radiation surveys shall be made and recorded at the jobsite or wellhead for each tracer operation, except those using hydrogen-3, carbon-14 and sulfur-35. These surveys shall include measurements of radiation levels before and after the operation.
- e) Records required pursuant to subsections (a) through (d) above shall include the dates, the identification of individual(s) making the survey, the identification of survey instrument(s) used and an exact description of the location of the survey. Records of these surveys shall be maintained for inspection by the Department for 5 years after completion of the survey.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.4020 Documents and Records Required at Field Stations

Each licensee or registrant shall maintain, for inspection by the Department, the following documents and records for the specific devices and sources used at the field station:

- a) Appropriate license, certificate of registration or equivalent document issued by the Nuclear Regulatory Commission, an Agreement State or Licensing State;
- b) Operating and emergency procedures required by Section 351.2020;
- c) 32 Ill. Adm. Code: Chapter II, Subchapters b and d;
- d) Records of the latest survey instrument calibrations pursuant to Section 351.1040;

- e) The dates of the latest tests for leakage or contamination performed on the sealed sources and the results of the tests;
- f) Quarterly inventories required pursuant to Section 351.1060;
- g) Utilization records required pursuant to Section 351.1070;
- h) Records of inspection and maintenance required pursuant to Section 351.1100; and
- i) Survey records required pursuant to Section 351.4010.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.4030 Documents and Records Required at Temporary Jobsites

Each licensee or registrant conducting operations at a temporary jobsite shall have the following documents and records available at that site for inspection by the Department:

- a) Operating and emergency procedures required by Section 351.2020;
- b) Survey records required pursuant to Section 351.4010 for the period of operation at the site;
- c) Evidence of current calibration for the radiation survey instruments in use at the site;
- d) The licensee's radioactive material license, including all appropriate amendments;
- e) When operating in the State under reciprocity as provided for in 32 Ill. Adm. Code 330.900, a copy of the appropriate license, certificate of registration or equivalent document(s); and
- f) The dates of the latest tests for leakage or contamination performed on the sealed sources and the results of the tests.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.5010 Notification of Incidents, Abandonment and Lost Sources

- a) Notification shall be made to the Department whenever an incident has occurred as described in 32 Ill. Adm. Code 340.1220 or 340.1230. Notification shall also be made to the Department whenever a source is leaking or contaminated in accordance with 32 Ill. Adm. Code 340.1260 or stolen, missing or lost, other than in downhole logging operations, in accordance with 32 Ill. Adm. Code 340.1210.
- b) Whenever a sealed source or device containing radioactive material is lodged downhole, the licensee or registrant shall:
 - 1) Monitor at the surface for the presence of radioactive contamination with a radiation survey instrument or logging tool during logging tool recovery operations; and
 - 2) Notify the Department immediately by telephone if radioactive contamination is detected at the surface or if the source appears to be damaged.
- c) When it becomes apparent that efforts to recover the radioactive source will not be successful, the licensee or registrant shall:
 - 1) Advise the well-operator of the regulations of the Illinois Department of Nuclear Safety regarding abandonment and the method of abandonment, which shall include:
 - A) The immobilization and sealing in place of the radioactive source with a cement plug;

- B) The setting of a whipstock or other deflection device; and
- C) The mounting of a permanent identification plaque, at the surface of the well, containing the appropriate information required by subsection (e) below;
- 2) Notify the Department immediately by telephone, and by mail within 10 calendar days, giving the circumstances of the loss and requesting approval of the adopted abandonment procedures; and
- 3) File a written report with the Department within 30 days of the abandonment, setting forth the following information:
 - A) Date of occurrence and a brief description of attempts to recover the source;
 - B) A description of the radioactive source involved, including radionuclide, quantity, and chemical and physical form;
 - C) Surface location and identification of well;
 - D) Results of efforts to immobilize and seal the source in place;
 - E) Depth of the radioactive source;
 - F) Depth of the top of the cement plug;
 - G) Depth of the well; and
 - H) Information contained on the permanent identification plaque.

- d) The Department will provide written approval of the request by the licensee pursuant to subsection (c)(2) above if the Department determines that accepted industry methods for recovery have been unsuccessful and the proposed abandonment procedures satisfy the requirements of subsection (c)(1) above.
- e) Whenever a sealed source containing radioactive material is abandoned downhole, the licensee shall provide a permanent plaque for posting the well or well-bore. This plaque shall:

AGENCY NOTE: An example of a suggested plaque is shown in Section 351.Appendix B.

1) Be constructed of long-lasting material, such as stainless steel or monel; and

- 2) Contain the following information engraved on its face:

- A) The word "CAUTION";
- B) The radiation symbol without the conventional color requirement;
- C) The date of abandonment;
- D) The name of the well operator or well owner;
- E) The well name and well identification number(s) or other designation;
- F) The sealed source(s) by radionuclide and quantity of activity;
- G) The source depth and the depth to the top of the plug; and
- H) An appropriate warning, depending on the specific circumstances of each abandonment.

AGENCY NOTE: Appropriate warnings may include: "Do not drill below plug back depth"; "Do not enlarge casing"; or "Do not re-enter the hole" followed by the words, "before contacting the Illinois Department of Nuclear Safety".

- f) The licensee or registrant shall notify the Department immediately by telephone and by mail within 10 calendar days, if the licensee knows or has reason to believe that radioactive material has been lost in or to an underground potable water source. Such notice shall designate the well location and shall describe the magnitude and extent of

loss of radioactive material, assess the health and environmental consequences of such loss and explain efforts planned or being taken to mitigate these consequences.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

Section 351.APPENDIX A Subjects To Be Included In Training Courses For Logging Supervisors

- I) Fundamentals of Radiation Safety
 - A) Characteristics of radiation
 - B) Units of radiation dose and quantity of radioactivity
 - C) Significance of radiation dose
 - 1) Radiation protection standards
 - 2) Biological effects of radiation dose
 - D) Levels of radiation from sources of radiation
 - E) Methods of minimizing radiation dose
 - 1) Working time
 - 2) Working distances
 - 3) Shielding
- II) Radiation Detection Instrumentation to be Used
 - A) Use of radiation survey instruments
 - 1) Operation
 - 2) Calibration
 - 3) Limitations
 - B) Survey Techniques
 - C) Use of personnel monitoring equipment
- III) Equipment to be Used
 - A) Handling equipment
 - B) Sources of radiation
 - C) Storage and control of equipment
 - D) Operation and control of equipment
- IV) The Requirements of Pertinent Federal and State Regulations
- V) The Licensee's or Registrant's Written Operating and Emergency Procedures
- VI) The Licensee's or Registrant's Record Keeping Procedures

Section 351.APPENDIX B Example of Plaque for Identifying Wells
Containing Sealed Sources Containing Radioactive Material
Abandoned Downhole



size of the plaque should be convenient for use on active or inactive wells, e.g., an 18-centimeter (7-inch) square. Letter size of the word "CAUTION" should be approximately twice the letter size of the rest of the information, e.g., 12-millimeter (1/2-inch) and 6-millimeter (1/4-inch) letter size, respectively. Quantities and distances may be expressed either in SI units or in special and English units or in dual units as above.

(Source: Amended at 18 Ill. Reg. 3344, effective February 22, 1994)

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TITLE 32: ENERGY**CHAPTER II: DEPARTMENT OF NUCLEAR SAFETY****SUBCHAPTER b: RADIATION PROTECTION
SUBCHAPTER b: RADIATION PROTECTION****PART 360****USE OF X-RAYS IN THE HEALING ARTS
INCLUDING MEDICAL, DENTAL, PODIATRY,
AND VETERINARY MEDICINE**

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360.71	Additional Requirements for Facilities Performing Mammography
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360.80	Photofluorographic Systems (Repealed)
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TABLE C	Entrance Exposure Limits Per Intraoral Bitewing Film (Repealed)

AUTHORITY: Implementing and authorized by the Radiation Protection Act of 1990 420 ILCS 40 .

SOURCE: Filed April 20, 1974 by the Department of Public Health; old rules repealed, new rules adopted at 4 Ill. Reg. 25, p. 157, effective July 1, 1980; transferred to the Department of Nuclear Safety by P.A. 81-1516, effective December 3, 1980; codified at 7 Ill. Reg. 16406; amended at 10 Ill. Reg. 13271, effective July 28, 1986; amended at 13 Ill. Reg. 803, effective April 1, 1989; amended at 15 Ill. Reg. 6180, effective April 16, 1991; amended at 17 Ill. Reg. 17972, effective October 15, 1993; amended at 18 Ill. Reg. 11524, effective July 11, 1994; emergency amendment adopted at 19 Ill. Reg. 273, effective December 30, 1994, for a maximum of 150 days; amended at 19 Ill. Reg. 8284, effective June 12, 1995.

Section 360.10 Scope

- a) This Part establishes requirements for use of x-ray producing devices in the healing arts by a practitioner licensed to practice a treatment of human ailments by virtue of the Medical Practice Act of 1987 (Ill. Rev. Stat. 1991, ch. 111, pars. 4401-1 et seq.) 225 ILCS 60 , the Illinois Dental Practice Act (Ill. Rev. Stat. 1991, ch. 111, pars. 2301 et seq.) 225 ILCS 25 , or the Podiatric Medical Practice Act of 1987 (Ill. Rev. Stat. 1991, ch. 111, pars. 4801 et seq.) 225 ILCS 100 , or by a medical radiographer or radiation therapist accredited in accordance with the provisions of 32 Ill. Adm. Code 401.100 or an individual exempt from the provisions of 32 Ill. Adm. Code 401, by Section 401.30 of that Part, acting under the supervision, prescription or direction of such licensed person or the non-human use of x-ray by veterinarians by virtue of the Veterinary Medicine and Surgery Practice Act of 1983 (Ill. Rev. Stat. 1991, ch. 111, pars. 7001 et seq.) 225 ILCS 115 . The provisions of this Part are in addition to, and not in substitution for, other applicable provisions of 32 Ill. Adm. Code 310, 320, 340, 400 and 410.
- b) It is recognized that some installations and equipment designed before the adoption of this Part, coupled with conditions of use, may be adequate to achieve minimum doses. Request for exemption from some provisions of this Part will be considered in accordance with 32 Ill. Adm. Code 310.30(a).

(Source: Amended at 18 Ill. Reg. 11524, effective July 11, 1994)

Section 360.20 Definitions

As used in this Part, the following definitions apply:

"Accelerator" (also "particle accelerator") means any therapeutic machine capable of producing a useful beam of x-rays or charged particles with energies of 1 MeV or greater. Accelerators include cyclotrons, betatrons and linear accelerators.

"Accelerator facility" means the location at which one or more particle accelerators are installed and are operated under the same administrative control.

"Aluminum equivalent" means the thickness of type 1100 aluminum alloy affording the same attenuation, under specified conditions, as the material in question. The nominal chemical composition of type 1100 aluminum alloy is 99.00 percent minimum aluminum, 0.12 percent copper.

"Applicator" means a structure which determines the extent of the treatment field at a given distance from the source of the beam.

"Attenuation block" means a block or stack, having dimensions 20 centimeters by 20 centimeters by 3.8 centimeters, of aluminum equivalent. Copper may be substituted for aluminum if an appropriate thickness is used for the kVp selected, as indicated below:

kVp	Millimeters of Copper Equivalent to 3.8 centimeters of aluminum
99 or less	2.0
100 to 125	2.5
greater than 125	3.0

"Automatic exposure control" means a device which automatically controls one or more technique factors in

order to obtain at a preselected location(s) a required quantity of radiation (see "Phototimer").

"Barrier" (see "Protective barrier").

"Beam" means a flow of electromagnetic or particulate radiation which passes through the opening in the beam limiting device and which is used for diagnosis or treatment.

"Beam axis" (see "Central axis of the beam").

"Beam-limiting device" means a device which provides a means to restrict the dimensions of the x-ray field (see "Collimator", "Diaphragm" and "Shutter").

"Beam monitoring system" means a system of devices that will monitor the useful beam during irradiation and will terminate irradiation when a preselected number of monitor units has been accumulated.

"Beam scattering filter" means a filter placed in an electron beam in order to scatter the beam and provide a more uniform distribution of electrons in the beam.

"Central axis of the beam" means the line passing through the source of the beam and the center of the plane formed by the edge of the first beam-limiting device.

"Charged particle beam" (see "Beam").

"Coefficient of variation" means the ratio of the standard deviation to the mean value of a population of observations.

"Collimator" means a device or mechanism by which the x-ray beam is restricted in size (see "Beam-limiting device").

"Computed tomography (CT)" means the production of a tomogram by the acquisition and computer processing of x-ray transmission data.

"Computed tomography dose index (CTDI)" means the integral of the dose profile along a line perpendicular to the tomographic plane divided by the product of the nominal tomographic section thickness and the number of tomograms produced in a single scan.

"Contact therapy system" means an x-ray system used for therapy which is designed for very short treatment distances (5 centimeters or less), usually employing peak tube potentials in the range of 20 to 50 kVp.

"Control panel" means that part or parts of the x-ray system upon which are mounted the switches, knobs, pushbuttons and other hardware necessary for setting the technique factors prior to initiating an x-ray exposure.

"CT gantry" means the tube housing assemblies, beam-limiting devices, detectors and the supporting structures and frames which hold these components.

"Dead-man switch" means a switch constructed so that a circuit-closing contact can be maintained only by continuous pressure on the switch by the operator.

"Densitometer" means a device which is used to provide a quantitative measurement of the optical density of x-ray

film to determine the response of the film to exposure and development.

"Diagnostic imaging specialist" means a person who possesses the knowledge, training and experience to apply the principles of radiological physics to diagnostic x-ray applications. A diagnostic imaging specialist shall meet one of the two criteria below:

Be certified by the American Board of Radiology, the American Board of Medical Physics or the Canadian College of Medical Physics in:

Diagnostic radiological physics; or
Radiological physics.

Be approved by the Department as a qualified nondepartment inspector pursuant to the provisions of 32 Ill. Adm. Code 410.30, and:

Have 3 years of experience performing radiation measurements and quality assurance duties for diagnostic imaging facilities; or

Have 2 years of experience performing radiation measurements and quality assurance duties and have undertaken a training program of at least 40 hours, conducted by a diagnostic imaging specialist, and which includes instruction in quality assurance procedures and the requirements of this Part.

AGENCY NOTE: A person performing physics duties for a diagnostic facility should have experience in the same field for which the duties are performed. For example, an individual providing support to mammography facilities should have 3 years of mammography experience. It is recognized that 3 years of experience for various imaging modalities could be gained concurrently.

"Diagnostic source assembly" means an x-ray tube housing assembly, designed for use in diagnostic x-ray applications, with a beam-limiting device attached.

"Diaphragm" means a device or mechanism by which the x-ray beam is restricted in size (see "Beam-limiting device").

"Field flattening filter" means a filter used to provide dose uniformity over the area of a useful beam of x-rays at a specified depth.

"Filter" means material placed in the useful beam to absorb, preferentially, radiations based on energy level or to modify the spatial distribution of the beam.

"Gantry" means that part of the system supporting and allowing possible movements of the radiation head.

"General purpose x-ray system" means any radiographic x-ray system which, by design, is not limited to radiographic examination of specific anatomical regions.

"Gonad shield" means a protective device for the testes or ovaries which provides a minimum of 0.5 millimeter lead equivalent protection.

"Half-value layer (HVL)" means the thickness of a specified material that attenuates the beam of radiation to

an extent such that the exposure rate is reduced to one-half of its original value.

AGENCY NOTE: The contribution of all scattered radiation, other than any that might be present initially in the beam concerned, should be minimized.

"Healing arts screening" means the examination of human beings using x-ray machines for the detection or evaluation of potential diseases when such examinations are not specifically ordered by a licensed practitioner of the healing arts legally authorized to prescribe such x-ray examinations for the purpose of diagnosis or treatment. However, healing arts screening does not include mammography on self-referred patients.

"Image intensifier" means a device, installed in a housing, which converts an x-ray pattern into a corresponding light image, usually by electronic means.

"Image receptor" means any device, such as a fluorescent screen or radiographic film, which transforms incident x-ray photons either into a visible image or into another form which can be made into a visible image by further transformations.

"Interlock" means a device arranged or connected such that the occurrence of an event or condition is required before a second event or condition can occur or continue to occur.

"Isocenter" means a fixed point in space located at the center of the smallest sphere through which the central axis of the useful beam passes at any beam orientation.

"Kilovolts peak (kVp)" means the crest value, in kilovolts, of the electric potential applied to the x-ray tube between the cathode and anode of a pulsating electric potential generator.

"Lead equivalent" means the thickness of lead affording the same attenuation, under specified conditions, as the material in question.

"Leakage radiation" means all radiation emanating from the diagnostic source assembly except for:

The useful beam; and

The radiation produced when the exposure switch or timer is not activated.

"Leakage technique factors" means the technique factors used to measure leakage radiation from the diagnostic source assembly. They are defined as follows:

For capacitor energy storage equipment, the maximum-rated peak tube potential and the maximum-rated number of exposures in 1 hour for operation at the maximum-rated peak tube potential with the quantity of charge per exposure being 10 millicoulombs, i.e. 10 milliampere-seconds, or the minimum obtainable from the unit, whichever is larger.

For field emission equipment rated for pulsed operation, the maximum-rated peak tube potential and the maximum-rated number of x-ray pulses in 1 hour for operation at the maximum-rated peak tube potential.

For all other equipment, the maximum-rated peak tube potential and the maximum-rated continuous tube current for the maximum-rated peak tube potential.

"Light field" means that area of the intersection of the light beam from the beam-limiting device and any one of the sets of planes parallel to and including the plane of the image receptor. The edge of the light field is defined as the locus of points at which the illumination is 25 percent of that at the center of the light field.

"Mammography" means radiography of the breast for the purpose of enabling a physician to determine the presence, size, location and extent of cancerous or potentially cancerous tissue in the breast.

"Mammography phantom" means a phantom specifically designed for image quality evaluation of mammography systems and which may also be used in the process of determining the mean glandular breast dose. It shall be any phantom material that is equivalent to a nominal 4.5-centimeter compressed breast of average density (i.e., 50 percent adipose and 50 percent glandular tissue), and shall contain masses, specks and fibers as specified in Section 360.71(j)(2).

"Mammography System" means an x-ray system that is used to perform mammography.

"Medical radiographer" means a person other than a licensed practitioner, accredited in accordance with the provisions of 32 Ill. Adm. Code 401, or an individual exempt from the provisions of 32 Ill. Adm. Code 401, who performs medical radiation procedures and applies x-radiation, to any part of the human body, for diagnostic purposes while under the supervision of a licensed practitioner.

"Mobile equipment" (see "X-ray equipment").

"Monitor unit" means a unit response from the beam monitoring system from which the absorbed dose can be calculated.

"Moving beam therapy" means radiation therapy in which there is displacement of the useful beam relative to the patient. Moving beam therapy includes arc therapy, skip therapy and rotational beam therapy.

"Multiple scan average dose (MSAD)" means the average dose at the center of a series of scans, specified at the center of the axis of rotation of a computed tomography system.

"Operator" means an individual who applies ionizing radiation for diagnostic or therapeutic purposes.

"Phototimer" means a method for controlling radiation exposures to image receptors by the amount of radiation which reaches a radiation monitoring device(s). The radiation monitoring device(s) is part of an electronic circuit which controls the duration of time the tube is activated (see "Automatic exposure control").

"Physicist" (see "Therapeutic radiological physicist").

"Portable equipment" (see "X-ray equipment").

"Position indicating device" means a device on intraoral dental x-ray equipment used to indicate the beam position and to establish a definite source-skin distance.

"Primary protective barrier" (see "Protective barrier").

"Protective apron" means an apron of radiation absorbing materials, at least 0.25 millimeter lead equivalent, used to reduce exposure from leakage and scatter radiation.

"Protective barrier" means a barrier of radiation absorbing material(s) used to reduce radiation dose. The types of protective barriers are as follows:

"Primary protective barrier" means the material, excluding filters, placed in the useful beam to reduce the radiation dose.

"Secondary protective barrier" means a barrier sufficient to attenuate the leakage and scatter radiation to the required degree.

"Protective glove" means a glove made of radiation absorbing materials, at least 0.25 millimeter lead equivalent, used to reduce dose from leakage and scatter radiation.

"Radiation beam" (see "Beam").

"Radiation therapy simulation system" means a radiographic/fluoroscopic x-ray system used exclusively for localizing the volume to be exposed during radiation therapy and confirming the position and size of the therapeutic irradiation field.

"Radiologist" means a physician or veterinarian who is either:

Certified by the American Board of Radiology in diagnostic radiology or general radiology;
Certified by the American Osteopathic Board of Radiology;
Certified by the American Chiropractic Board of Radiology; or
Certified by the American College of Veterinary Radiology; or
Eligible for certification by any College or Board identified above.

"Reference plane" means a plane which is displaced from and parallel to the tomographic plane.

"Scan" means the complete process of collecting x-ray transmission data for the production of a tomogram. Data can be collected simultaneously during a single scan for the production of one or more tomograms.

"Scan increment" means the amount of relative displacement of the patient support device with respect to the CT x-ray system between successive scans measured along the direction of such displacement.

"Scatter radiation" means radiation that, during passage through matter, has been deviated in direction.

"Secondary protective barrier" (see "Protective barrier").

"Sensitometer" means a device which is used to test the setup and stability of film processing procedures and equipment by providing a standard pattern of light exposure of x-ray film.

"Shadow tray" means a device attached to the radiation head to support auxiliary beam-limiting material.

"Shutter" means an adjustable beam-limiting or attenuating device, usually made of lead, fixed to an x-ray tube housing to intercept or collimate the useful beam (see "Beam-limiting device").

"SID" means source-image receptor distance (see "Source-image receptor distance").

"Source" means the focal spot of the x-ray tube.

"Source-image receptor distance" means the distance from the source to the center of the input surface of the image receptor.

"Source-skin distance (SSD)" means the distance measured along the central ray from the center of the front surface of the x-ray focal spot to the surface of the irradiated object.

"Special purpose x-ray system" means any radiographic x-ray system which, by design, is limited to radiographic examination of a specific anatomical region.

"Spot film" means a radiograph which is made during a fluoroscopic examination to permanently record conditions which exist during that fluoroscopic procedure.

"Stationary beam therapy" means radiation therapy in which there is no displacement of the useful beam relative to the patient during irradiation.

"Stationary equipment" (see "X-ray equipment").

"Technique factors" means the electrical potential (kilovolts), current (milliamperes), exposure time parameters (seconds or pulses) or a combination thereof, selectable at the control panel of an x-ray system (see "Control panel").

"Therapeutic Radiological Physicist" means an individual who has the knowledge, training and experience to measure ionizing radiation, evaluate safety techniques, advise regarding radiation protection needs and apply the principles of radiological physics to clinical radiation therapy. To meet these criteria, a therapeutic radiological physicist shall:

Be certified by the American Board of Radiology, the American Board of Medical Physics or the Canadian College of Medical Physics in:

Therapeutic radiological physics; or
Roentgen ray and gamma ray physics; or
X-ray and radium physics; or
Radiological physics; or

Hold a master's degree or doctorate in physics, biophysics, radiological physics or health physics and have completed 1 year of full-time training in radiological physics and also 1 year of full-time work experience under the supervision of a therapeutic radiological physicist at a medical institution. To meet this requirement, the individual shall have performed the tasks specified in Sections 360.120(c), (d) and (e) under the supervision of a therapeutic radiological physicist during the year of work experience.

"Tomogram" means the depiction of the x-ray attenuation properties of a section through the body.

"Tomographic plane" means that geometric plane which is identified as corresponding to the output tomogram.

"Tomographic section" means the volume of an object whose x-ray attenuation properties are imaged in a tomogram.

"Useful beam" (see "Beam").

"X-ray equipment" means an x-ray system, sub-system or component thereof. Types of x-ray equipment are as follows:

"Mobile x-ray equipment" means x-ray equipment mounted on a permanent base with wheels and/or casters for moving while completely assembled. Mobile x-ray equipment includes x-ray equipment permanently mounted in vehicles.

"Portable x-ray equipment" means x-ray equipment designed to be hand-carried.

"Stationary x-ray equipment" means x-ray equipment which is installed in a fixed location.

"X-ray field" means, for diagnostic purposes, that area of the intersection of the useful beam and any one of the set of planes parallel to and including the plane of the image receptor. The edge of the x-ray field is defined as the locus of points at which the exposure is 25 percent of that at the center of the x-ray field.

"X-ray system" means an assemblage of components for the controlled production of x-rays. It includes minimally an x-ray high-voltage generator, an x-ray control panel, an x-ray tube housing assembly, a beam-limiting device and the necessary supporting structures. Additional components which function with the system are considered integral parts of the system. X-ray systems include diagnostic systems, therapeutic systems and accelerator systems.

(Source: Amended at 18 Ill. Reg. 11524, effective July 11, 1994)

Section 360.30 General Requirements and Administrative Controls

The requirements in this Section apply to all uses of x-rays in veterinary medicine and to all uses of x-rays in the healing arts including the use of x-rays for both diagnostic and therapeutic purposes. Additional requirements for all diagnostic x-ray systems are in Section 360.40 and specific equipment application classes are contained in Sections 360.41 through 360.100. For therapeutic x-ray systems also see Sections 360.110 and 360.120.

a) Registrant. The registrant shall:

- 1) Direct the operation of the x-ray system(s);
- 2) Register with the Department, in accordance with the provisions of
- 3) Submit an application for inspection of radiation machines to the Department in accordance with 32 Ill. Adm. Code 410 and, if the inspection is performed by a qualified nondepartment inspector, submit a copy of the radiation inspection report to the Department;
- 4) Permit operation of the x-ray system(s) only by individuals who are licensed in accordance with State law (see Section 360.10(a)), or who are

facility and all portable or mobile x-ray equipment used by the registrant;

accredited by the Department pursuant to 32 Ill. Adm. Code 401 or who are exempt from such requirements in accordance with the provisions of 32 Ill. Adm. Code 401.

- b) Shielding. Each installation shall be provided with such primary barriers and/or secondary barriers as are necessary to assure compliance with the provisions of 32 Ill. Adm. Code 340.210, 340.270, 340.280 and 340.310.
- c) An x-ray system which does not meet the provisions of this Part shall not be operated for diagnostic or therapeutic purposes.
- d) If an x-ray system is identified as not being in compliance with the provisions of this Part and if that system is accessible for use, it shall be rendered inoperable (i.e. dismantle the x-ray source from the source support assembly) if so ordered by the Director.
- e) Prohibitions
 - 1) Unauthorized Exposure. Individuals shall not be exposed to the useful beam except for healing arts purposes and only when such exposure has been authorized by a licensed practitioner of the healing arts. This provision specifically prohibits deliberate exposure for the following purposes:
 - A) Exposure of individuals for training, demonstration or other non-healing arts purposes.
 - B) Exposure of individuals for the purpose of "healing arts screening" (see Section 360.20).
 - 2) Fluoroscopy shall not be used as a substitute for radiography or in lieu of proper anatomical positioning/centering procedures prior to radiographic studies.
 - 3) Fluoroscopic equipment using phosphorescent screens shall not be used. Image intensification shall be utilized on all fluoroscopic equipment.
 - 4) The use of direct exposure x-ray film (without intensifying screens) for routine diagnostic radiological imaging procedures, other than intraoral dental radiography and therapeutic portal imaging, is prohibited.

AGENCY NOTE: Therapeutic portal imaging is a technique used in radiation therapy to verify correct alignment of therapy beams with the patient's anatomy.
 - 5) The use of photofluorographic systems is prohibited.

AGENCY NOTE: Photofluorography is frequently called mass miniature radiography. In this technique the image of a fluorescent screen is recorded on film by means of a camera.
- f) Individual Monitoring and Reporting Requirements. All persons who are associated with the operation of an x-ray system are subject to the radiation dose standards, requirements for the determination of the doses, requirements for individual monitoring and requirements for reporting of radiation doses which are contained in 32 Ill. Adm. Code 340.
- g) The registrant shall comply with the requirements of the Department's rules entitled, Notices, Instructions and Reports to Workers; Inspections, 32 Ill. Adm. Code 400.
- h) Records and Associated Information. The registrant shall maintain at the facility, for a period of at least one inspection cycle (see 32 Ill. Adm. Code 410.60(d)), records showing the receipt, transfer, storage and disposal of all sources of radiation in accordance with the provisions of 32 Ill. Adm. Code 310 and 320.
- i) Staff Qualifications. The registrant shall maintain at the facility, for review by the Department, current certificates

of accreditation (clear, legible copies are acceptable), issued by the Department in accordance with the provisions of 32 Ill. Adm. Code 401, for all individuals who are required to be so accredited.

- j) Radiation Safety Procedures. The registrant shall provide to each individual who operates x-ray equipment at the facility written operating and safety procedures. These procedures shall include restrictions required for the safe operation of each radiation machine and shall include the topics listed in the radiation safety program of subsection (k) below.
- k) Radiation Safety Program. The registrant shall provide for initial and annual in-service training in radiation safety for individuals (excluding licensed practitioners) that apply ionizing radiation at the facility, to ensure their awareness of the registrant's radiation safety practices and policies.

The in-service training shall include the following topics:

- 1) Operating and emergency procedures for the radiation machine(s);
- 2) Use of personnel and patient protective devices;
- 3) Procedures to minimize patient and occupational doses, including procedures for selecting personnel to support patients or film, as required by Section 360.40;
- 4) Use of individual monitoring devices (if such devices are used at the facility);
- 5) Film processing procedures; and
- 6) Prohibited uses of x-ray machines, as described in subsection (e), above.
- l) Operator Training. Individuals who operate radiation machines shall be instructed in and able to demonstrate competence with the registrant's operating and safety procedures.

(Source: Amended at 18 Ill. Reg. 11524, effective July 11, 1994)

Section 360.40 General Equipment and Operation Requirements for Diagnostic X-Ray Systems

The requirements of this Section apply to all diagnostic x-ray systems. Additional requirements for specific equipment application classes are in Sections 360.41 through 360.100.

- a) Half-Value Layer
 - 1) The half-value layer of the useful beam for a given x-ray tube potential shall not be less than the values shown in Section 360. Table B.
 - 2) For capacitor energy storage equipment, compliance with the requirements of this subsection shall be determined with the maximum quantity of charge per exposure. This will be deemed to have been met if an mAs of 10 or greater has been used.
- b) Beam-On Indicators
 - 1) The control panel shall include a device (usually a milliammeter or labeled indicator lamp) which will give positive indication of the production of x-rays whenever the x-ray tube is energized.
 - 2) Where two or more radiographic tubes are controlled by one exposure switch, the tube or tubes which have been selected shall be clearly indicated prior to initiation of the exposure. This indication shall be both on the x-ray control panel and at or near the tube housing assembly which has been selected.
- c) Mechanical Support of Tube Head. The tube housing assembly supports shall be adjusted such that the tube housing assembly will remain stable during an exposure unless tube housing movement is a designed function of

the x-ray system. The tube housing assembly supports shall not be hand-held unless the manufacturer has specifically designed the system to be operated while hand-held.

- d) Diagnostic Source Assembly Leakage Radiation Limits. The leakage radiation measured at a distance of 1 meter from the source shall not exceed 25.8 microC/kg(100mR) in 1 hour when the tube is operated at its leakage technique factors.
- e) Radiation From Capacitor Energy Storage X-ray Equipment in Standby Status. Radiation emitted from the x-ray tube when the exposure switch or timer is not activated shall not exceed a rate of 0.516 microC/kg (2mR) per hour at 5 centimeters from any accessible surface of the diagnostic source assembly, with the beam-limiting device fully open.
- f) Technique Indicators
 - 1) The technique factors to be used during an exposure shall be indicated at the control panel before the exposure begins. If automatic exposure controls are used, the technique factors which are set prior to the exposure shall be indicated at the control panel.
 - 2) The requirement of subsection (1) above may be met by permanent markings on equipment having fixed technique factors. Indication of technique factors shall be visible from the operator's position except in the case of spot films.
 - 3) The indicated technique factors of exposure time and kilovolts peak (kVp) shall correspond to the actual exposure factors within ten percent of the measured values.
- g) Reproducibility of Exposures
 - 1) For any specific combination of selected technique factors utilized, the coefficient of variation of radiation exposures shall not exceed 0.05 for any specific combination of selected technique factors. It will not be necessary to calculate the coefficient of variation if for four consecutive measurements the value of the average exposure (E_{avg}) is greater than or equal to ten times the maximum exposure (E_{max}) minus the minimum exposure (E_{min}). This requirement is mathematically represented by the following:

$$E_{avg} \geq 10(E_{max} - E_{min})$$
 - 2) For systems using automatic exposure control (AEC), compliance measurements shall be performed with the system operating in the AEC mode. Attenuating material shall be placed in the beam to provide exposure times in the range of those used clinically.

AGENCY NOTE: The intent of this subsection is to require testing of the system in a manner that is clinically relevant. Reproducibility of exposures should be measured at technique factors that are commonly used and are subject to variation. For AEC systems, commonly used settings in combination with an appropriate thickness of attenuating material should be used to provide exposure times in the clinical range.
- h) Patient or Film Support
 - 1) When a patient or film must be provided with auxiliary support during a radiation exposure:
 - A) No person shall be used routinely to hold film or patients; and
 - B) Unless the procedure precludes their use, mechanical holding devices shall be used to

restrain patients. For example, mechanical holding devices could not be used if the devices would preclude clear visualization of the tissue being examined.

- 2) When a patient or film must be held by an individual, written safety procedures, as required by Section 360.30(j), shall indicate the criteria for selecting a holder and the procedure the holder shall follow.

AGENCY NOTE: The radiation dose received by radiation workers, patients and the general public can be reduced if mechanical patient and film support devices are used for radiographic and fluoroscopic procedures. In the event that an individual must be used in lieu of mechanical patient or film support devices to hold patients or films, every effort should be made to limit the individual's radiation dose. This can be accomplished by not assigning to a single individual the task of supporting patients and films during radiographic and fluoroscopic examinations. Rather, a number of individuals may be rotated through the assignment, thereby reducing the radiation dose to one individual.

i) Personnel Protection

- 1) Except for patients who cannot be moved out of the room, only the individuals required for the medical procedure or training shall be in the room during the radiographic/fluoroscopic exposure.
- 2) Individuals who must be in the room with the patient being radiographed or fluoroscoped shall be protected by 0.25 millimeter lead equivalent apparel or device or shall be positioned at a distance such that the individual does not receive a radiation dose in excess of the limits specified in 32 Ill. Adm. Code 340.310.

j) Technique Guides

- 1) In the vicinity of each radiographic x-ray system's control panel, a technique guide shall be provided which specifies for routine examinations performed with that system, the following information:
 - A) Patient's anatomical size versus technique factors to be utilized;
 - B) Type and size of the film or screen-film combination to be used; and
 - C) SID to be used.
- 2) For automatic exposure control (AEC) systems (i.e., systems employing photo-multiplier tubes or ionization chambers to terminate the x-ray exposure) with selectable exposure detectors and density settings, the technique guide shall also specify the appropriate exposure detector(s) and density setting to be utilized for each radiographic examination listed.
- 3) For AEC systems, the technique guide shall specify the requirements of subsections (1)(A) through (C) above to be followed if operated in a non-automatic mode.

AGENCY NOTE: The Department recognizes that alternate means may be available at the control panel to indicate technique factors for computerized imaging systems.

- k) Patient Dose Criteria. Procedures and auxiliary equipment designed to minimize patient and occupational dose commensurate with needed diagnostic information shall be used.

AGENCY NOTE: It is the intent of this subsection to provide for the optimum optical density, resolution and contrast on the film while minimizing patient dose. X-ray

films, intensifying screens and other image recording devices should be as sensitive as is consistent with the requirements of the examination.

- l) X-ray Film Processing Systems. The darkroom safe light illumination shall be adequate for the film speed(s) and the darkroom operating procedures used to prevent fogging of unprocessed film. The following additional requirements apply to film processing systems:

- 1) Manual film processing systems shall be monitored by the registrant to assure:

- A) The use of a dedicated darkroom timer with an adjustable preset function. The timer shall be used to adjust film processing time according to solution temperature.
- B) The use of a dedicated darkroom thermometer. The thermometer shall be used to adjust the film processing time according to solution temperature.
- C) The use of a film processing guide. The guide shall contain, at a minimum, information regarding time(s) and temperature(s) (as recommended by the processing chemical manufacturer) used by the registrant to develop radiographs.
- D) The frequency at which film processing chemicals are changed is appropriate for the conditions of use.

- 2) Automated film processing shall be monitored by the registrant to assure:

- A) The temperature of film processing chemicals is appropriate for the type of film(s) being processed at the film transport speed selected.
- B) The film processing chemicals used and their replenishing rate (if applicable) are appropriate for the film transport speed selected.

- m) Gonadal Shielding. Except for cases in which it would interfere with the diagnostic procedure, gonadal shielding of not less than 0.5 millimeter of lead equivalent shall be used for patients (who have not passed the reproductive age) during those radiographic procedures in which the gonads are in the useful beam.

AGENCY NOTE: Protection of the embryo or fetus from radiation dose during radiological examination or treatment of a woman of childbearing age (potentially pregnant) should be given special consideration.

(Source: Amended at 18 Ill. Reg. 11524, effective July 11, 1994)

Section 360.41 Additional Requirements for Use of Diagnostic X-Ray Systems in the Healing Arts of Medicine, Podiatry and Chiropractic

- a) Viewing System. Windows, mirrors, closed circuit television or an equivalent system shall be provided to permit the operator to continuously observe the patient during irradiation.
- b) The operator shall be able to maintain aural contact with the patient.
- c) Each x-ray control shall be located in such a way as to meet the following requirements:
 - 1) Stationary x-ray systems and mobile or portable x-ray systems used as stationary x-ray systems shall be required to have the x-ray exposure switch permanently mounted behind a protective barrier.
 - 2) For mobile and portable single event exposures and configuration, the x-ray control shall be positioned

so that the operator is at least 1.83 meters (6 feet) away from the tube housing and the patient during an exposure.

- d) Portable or mobile x-ray equipment shall be used only for examinations where it is impractical to transfer the patient(s) to a stationary x-ray installation.

(Source: Added at 17 Ill. Reg. 17972, effective October 15, 1993)

Section 360.50 Fluoroscopic Systems

In addition to the provisions of Sections 360.10, 360.30, 360.40 and 360.41, the requirements of this Section apply to x-ray equipment and associated facilities used for fluoroscopy.

- a) Beam Limitation. The x-ray field shall be limited by stepless adjustable shutters. In addition:

- 1) The minimum field size at the greatest SID shall be no greater than 5 centimeters by 5 centimeters.
- 2) The mechanism(s) (manual/automatic mode selector(s)) provided for activating and positioning the beam-limiting shutters shall function properly. This requirement applies to shutters used in fluoroscopic procedures or spot filming procedures or both fluoroscopic and spot filming procedures.
- 3) Neither the length nor the width of the x-ray field in the plane of the image receptor shall exceed that of the visible area of the image receptor by more than three percent of the SID. The sum of the excess length and the excess width shall be no greater than four percent of the SID. This requirement applies to field sizes for fluoroscopic procedures or spot filming procedures or both fluoroscopic and spot filming procedures.
- 4) For fluoroscopic equipment with only a manual mode of beam limitation, the x-ray field produced shall be limited to the area of the spot film cassette at 40.6 centimeters (16 inches) above the tabletop. Additionally, during fluoroscopy, the operator shall restrict the beam to the area of the input phosphor.
- 5) Spot film devices shall meet the following additional requirements:
 - A) Means shall be provided between the source and the patient for adjustment of the x-ray field size in the plane of the image receptor to the size which has been selected on the spot film selector. Such adjustment shall be accomplished automatically except when the x-ray field size in the plane of the image receptor is smaller than that selected;
 - B) The center of the x-ray field in the plane of the image receptor shall be aligned with the center of the selected portion of the film to within two percent of the SID; and
 - C) If the angle between the plane of the image receptor and beam axis is variable, a device shall be provided to visually indicate when the axis of the x-ray beam is perpendicular to the plane of the image receptor.
- 6) The beam limitation requirements of this subsection shall not apply to fluoroscopic systems specifically designed for examination of extremities only and meeting the requirement of subsection (1) below.

- b) Fluoroscopic Timer. A manual reset, cumulative timing device shall be used which will either indicate elapsed on-time by an audible signal or turn off the system when the total exposure time exceeds a predetermined limit not exceeding 5 minutes in one or a series of exposures.

- c) Primary Barrier/Interlock. These devices shall be provided and shall function so that:
 - 1) The entire cross section of the useful beam is intercepted by the primary protective barrier of the fluoroscopic image assembly at any SID; and
 - 2) The fluoroscopic tube is interlocked to prevent the unit from producing x-rays unless the primary barrier is in position to intercept the useful beam, as specified in subsection(1) above, at all times.
- d) Source-Skin Distance. The SSD shall not be less than:
 - 1) 38 centimeters (15 inches) on all stationary fluoroscopes;
 - 2) 20 centimeters (8 inches) on all mobile fluoroscopes; and
 - 3) 9.5 centimeters (4 inches) for fluoroscopes specifically designed for examination of extremities only and meeting the requirements of subsection (1) below.
- e) Indication of Potential and Current. During fluoroscopy and recording of fluoroscopic images, the kV and the mA shall be continuously indicated at the control panel and/or the operator's position.
- f) Activation of the Fluoroscopic Tube. X-ray production in the fluoroscopic mode shall be controlled by a device which requires continuous pressure by the operator for the entire time of any exposure. When recording serial fluoroscopic images, the operator shall be able to terminate the x-ray exposure(s) at any time, but means may be provided to permit completion of any single exposure of the series in process.
- g) Entrance Exposure Requirements
 - 1) Maximum Exposure Rate. Fluoroscopic systems shall not be operable at any combination of tube potential and current which will result in an exposure rate in excess of 2.58 mC/kg(10 R) per minute at the point where the center of the useful beam enters the patient, except:
 - A) During recording of fluoroscopic images; or
 - B) When an optional high level control is activated (See subsection (2) below).
 - 2) When a high level control is activated, the equipment shall not be operable at any combination of tube potential and current which will result in an exposure rate in excess of 5.15 mC/kg(20 R) per minute at the point where the center of the useful beam enters the patient. In addition, the following requirements apply to high level controls:
 - A) Separate means of activation of high level controls shall be required. The high level control shall only be operable when continuous manual activation is provided by the operator.
 - B) A continuous signal audible to the operator shall indicate that the high level control is being employed.
 - 3) Compliance with the requirements of subsections (1) and (2) above shall be determined using technique factors that produce the maximum exposure rate. For systems employing automatic exposure rate control, material having an equivalency of at least 3 millimeters of lead shall be placed in the primary beam between the image receptor and the radiation measuring device. The lead or equivalent material shall be positioned to ensure that the entire primary beam is blocked. AGENCY NOTE: Many fluoroscopic systems do not yield their maximum exposure rate at the maximum tube potential or tube current. The exposure rate should be checked at various kVp

and mA settings to establish the maximum exposure rate for the system.

- 4) Fluoroscopic systems shall not be operable at any combination of tube potential and current that will result in an exposure rate in excess of 1.29 mC/kg(5 R) per minute at the point where the center of the useful beam enters the patient, when measured under the following conditions:

- A) Movable grids and compression devices shall be removed from the useful beam during the measurement.
- B) For systems without automatic exposure rate control, the measurement shall be performed using technique factors clinically used for a standard adult patient thickness of 23 centimeters.

AGENCY NOTE: An attenuation block or other suitable material should be placed in the beam to protect the imaging system.

- C) For systems with automatic exposure rate control, the measurement shall be performed with an attenuation block or other material simulating the standard adult patient thickness of 23 centimeters, in the beam between the radiation measuring device and the image receptor.

AGENCY NOTE: The Department recommends additional measurements be made of the entrance exposure rate for fluoroscopic systems capable of recording fluoroscopic images, and the entrance exposure for spot film techniques for fluoroscopic systems with that modality. In either case, measurements should be made under the conditions specified in subsection (B) above.

- D) The requirements of subsection (4) shall not apply to fluoroscopes specifically designed for examination of extremities only and meeting the requirements of subsection (1) below.

- 5) Measurements performed pursuant to the requirements of subsections (1) through (4) above shall meet the following additional requirements:

- A) If the source is below the table, the exposure rate shall be determined for the center of the useful beam 1 centimeter above the tabletop or cradle.
- B) If the source is above the table, the exposure rate shall be determined at 30 centimeters (12 inches) above the tabletop with the end of the beam-limiting device or spacer positioned as closely as possible to the point of measurement.
- C) For a fixed SID C-arm type of fluoroscope, the exposure rate shall be determined 30 centimeters (12 inches) from the input surface of the fluoroscopic imaging assembly.
- D) For a variable SID C-arm type of fluoroscope, the exposure rate shall be determined 30 centimeters (12 inches) from the input surface of the fluoroscopic imaging assembly with the end of the beam-limiting device or spacer positioned as close as possible to the point of measurement.
- E) For a lateral type fluoroscope, the exposure rate shall be determined on the central axis of the primary beam at a point 15

centimeters (6 inches) from the centerline of the x-ray table and in the direction of the x-ray source with the end of the beam-limiting device or spacer positioned as closely as possible to the point of measurement. If the tabletop is movable, it shall be positioned as closely as possible to the lateral x-ray source, with the end of the beam-limiting device or spacer no closer than 15 centimeters to the centerline of the x-ray table.

AGENCY NOTE: A lateral type fluoroscope is a fluoroscope that cannot be rotated so that the source or the fluoroscopic imaging assembly can be positioned below the fluoroscopic table or cradle.

- F) For a fluoroscopic system specifically designed for examination of extremities only, the exposure rate shall be determined for the minimum source-skin distance.

- 6) The measurements required by subsection (g) above shall be performed when the system is inspected as specified in 32 Ill. Adm. Code 410 as well as after any maintenance of the system which might affect the exposure rate.

- 7) The results of the measurements required by subsections (1), (2) and (4) above shall be posted or available at the control panel. The measurement results shall be stated in millicoulombs per kilogram (roentgens) per minute or microcoulombs per kilogram (milliroentgens) per second and shall include the technique factors used in determining such results. The name of the individual performing the measurements and the date the measurements were performed shall be included in the results.

AGENCY NOTE: The resolution and efficiency of the fluoroscopic imaging system should be evaluated periodically, whenever deterioration in the imaging system is suspected and when the measured exposure rate exceeds the standards of this Section.

h) Barrier Transmitted Radiation Rate Limits

- 1) The exposure rate due to transmission through the primary protective barrier shall not exceed 0.516 microC/kg(2mR) per hour at 10 centimeters from any accessible surface of the fluoroscopic imaging assembly beyond the plane of the image receptor per 258 microC/kg (1R) per minute of entrance exposure rate.

2) Measuring Compliance of Barrier Transmission

- A) The exposure rate due to transmission through the primary protective barrier shall be determined by measurements averaged over an area of 100 square centimeters with no linear dimension greater than 20 centimeters.
- B) If the source is below the tabletop, the exposure rate shall be determined with the input surface of the fluoroscopic imaging assembly positioned 30 centimeters above the tabletop.
- C) If the source is above the tabletop and the SID is variable, the exposure rate shall be determined with the end of the beam-limiting device or spacer as close to the tabletop as it can be placed, provided that it shall not be closer than 30 centimeters.

- D) Movable grids and compression devices shall be removed from the useful beam during the measurement.
- E) An attenuation block shall be positioned in the useful beam 10 centimeters from the point of measurement of entrance exposure rate and between this point and the input surface of the fluoroscopic imaging assembly.
- i) Staff and Ancillary Personnel Protection. The operator, assistants and observers allowed in the examining room shall be protected from scatter radiation by protective aprons of not less than 0.25 millimeter lead equivalent or whole body protective barriers or shall be positioned at a sufficient distance to ensure that the individual does not receive a radiation dose in excess of the limits specified in 32 Ill. Adm. Code 340.310.
- j) Control of Scattered Radiation
 - 1) For fluoroscopic systems utilizing an x-ray tube that is mounted below the table, the table shall be provided with shielding (bucky slot cover) equivalent to 0.25 millimeter lead equivalent to attenuate scattered radiation emanating from below the table.
 - 2) A shield of at least 0.25 millimeter lead equivalent, such as overlapping protective drapes or hinged or sliding panels, shall be provided and used to intercept scatter radiation which would otherwise reach the operator and others near the machine. This shielding shall not be a substitute for the wearing of a protective apron (0.25 millimeter lead equivalent) for protection against scattered radiation.
 - 3) Where sterile fields or special procedures prohibit the use of protective barriers or drapes, subsection (2) above shall not apply.
- k) Additional Requirements for Stationary Fluoroscopic Systems Used for Cardiac Catheterization Procedures
 - 1) Protective barriers shall be available for use by individuals whose presence is required in the room during activation of the x-ray tube(s). If a protective barrier includes or consists of a transparent viewing panel, the viewing panel shall afford protection of not less than 0.5 millimeter of lead equivalent.
 - 2) Protective aprons of not less than 0.25 millimeter of lead equivalent shall be worn in the fluoroscopy room by all individuals (except the patient).
AGENCY NOTE: Because modern equipment allows great flexibility in the direction of the beam, individuals in the room should step back from the x-ray system and behind protective barriers during activation of the x-ray tube(s).
- l) Additional Requirements for Fluoroscopic Systems Specifically Designed for Examination of Extremities Only
 - 1) The radiation safety procedures required pursuant to Section 360.30(j) shall include the following:
 - A) A warning concerning the potential for, and the hazards of, increased patient radiation dose associated with x-ray systems employing short source-skin distances;
 - B) Procedures for obtaining imaging magnification with minimum patient dose, including imaging systems or screen-film combinations;
 - C) Technique factors for specific examinations for which the system is designed;

- D) Radiation exposure data, including skin entrance exposure for each set of technique factors used.
- 2) The x-ray system shall be clearly labeled as follows: "For Examination of Extremities Only."
- 3) The source-skin distance shall be limited as specified in subsection (d) above.
- 4) Fluoroscopic systems specifically designed for examination of extremities only shall be used solely for examination of extremities.
- m) Radiation Therapy Simulation Systems. Radiation therapy simulation systems shall be exempt from the requirements of subsections (a), (b), (c), (g) and (h) above provided that:
 - 1) Such systems are designed and used in such a manner that no individual other than the patient is in the x-ray room during periods of time when the system is producing x-rays; and
 - 2) Such systems that do not meet the requirements of subsection (b) above are provided with a means of indicating the cumulative time that an individual patient has been exposed to x-rays. Procedures shall require in such cases that the timer be reset between examinations.
- n) Operator Restrictions. No person shall intentionally administer radiation to a human being with a fluoroscopic radiation machine unless such person is licensed to practice a treatment of human ailments under the Medical Practice Act of 1987, the Illinois Dental Practice Act or the Podiatric Medical Practice Act of 1987, except:
 - 1) An accredited medical radiographer may operate a fluoroscope for static functions when interpretation of the results is not required and only under the direct supervision of a licensed practitioner who is within visual contact; or
 - 2) An accredited medical radiographer or radiation therapist may operate a fluoroscope for radiation therapy simulation procedures under the direct supervision of a licensed practitioner.

(Source: Amended at 18 Ill. Reg. 11524, effective July 11, 1994)

Section 360.60 Radiographic Systems Other Than Fluoroscopic, Dental, Veterinary or Computed Tomography Systems

In addition to the provisions of Sections 360.10, 360.30, 360.40 and 360.41, the requirements of this Section apply to x-ray equipment and associated facilities used in the healing arts of medicine, chiropractic and podiatry. It does not apply to fluoroscopic, dental, veterinary or computed tomography systems.

- a) Beam Limitation. The useful beam shall be limited to the area of clinical interest.
 - 1) Stationary General Purpose and Mobile/Portable X-Ray Systems
 - A) Variable X-Ray Field Limitation. An adjustable collimator shall be provided with means for independent stepless adjustment of the size of the x-ray field.
 - B) Visual Indication of Field Size. Means shall be provided for visually defining the perimeter of the x-ray field. The total misalignment of the edges of the visually defined field, with respect to the edges of the x-ray field, along either the length or the width of the visually defined field, shall not exceed two percent of the distance from the source to the center of the visually defined field when the surface upon which it appears

is perpendicular to the axis of the x-ray beam.

AGENCY NOTE: When a light localizer is used to define the x-ray field, it should provide an average illumination of not less than 100 lux (9 footcandles) at 100 centimeters or at the maximum SID, whichever is less.

- 2) Additional Requirements for Stationary General Purpose X-Ray Systems. In addition to the requirements of subsection (1) above, all stationary general purpose x-ray systems shall meet the following requirements:

- A) The beam-limiting device shall numerically indicate the x-ray field size in the plane of the image receptor to which it is adjusted.
- B) The x-ray field dimensions shall be specified in centimeters and/or inches and shall be such that aperture adjustments result in x-ray field dimensions in the plane of the image receptor that do not differ from the numerical indicated dimensions by more than plus or minus two percent of the SID when the beam axis is perpendicular to the plane of the image receptor.
- C) The beam-limiting device shall be provided with SID scales that reflect the actual SID(s) used for radiographic procedures.
- D) SID Indication
 - i) Means shall be provided to indicate the SID.
 - ii) SIDs shall be indicated in centimeters and/or inches and the measured SID shall correspond to the indicated value to within two percent.
- E) X-Ray Field/Image Receptor Alignment. Means shall be provided to:
 - i) Indicate when the axis of the x-ray field is perpendicular to the plane of the image receptor; and
 - ii) Align the center of the x-ray field with respect to the center of the image receptor to within two percent of the SID.

- 3) Special Purpose X-Ray Systems

- A) SID Indication
 - i) Means shall be provided to indicate the SID.
 - ii) SIDs shall be indicated in centimeters and/or inches and the measured SID shall correspond to the indicated value to within two percent.
- B) Means shall be provided to limit the x-ray field in the plane of the image receptor so that such field does not exceed each dimension of the image receptor by more than two percent of the SID when the axis of the x-ray beam is perpendicular to the plane of the image receptor.
- C) Means shall be provided to align the center of the x-ray field with the center of the image receptor to within two percent of the SID.
- D) The requirements of subsection(B) above may be met:

- i) With a system that meets the requirements specified in subsection(1) above; or
- ii) With an assortment of removable, fixed-aperture, beam-limiting devices sufficient to meet the requirement for each combination of image receptor size and SID for which the unit is used, with each such device having permanent, clearly legible markings, in centimeters and/or inches, to indicate the image receptor size and SID for which it is designed; or
- iii) With a beam-limiting device having multiple fixed apertures sufficient to meet the requirement for each combination of image receptor size and SID for which the unit is used. Permanent, clearly legible markings, in centimeters and/or inches, shall indicate the image receptor size and SID for which each aperture is designed and shall indicate which aperture is in position for use.

E) Exemptions

- i) Radiation Therapy Simulation Systems. Radiation therapy simulation systems shall be exempt from the beam limitation requirements of subsection (B) above.
- ii) Mammography Systems. Mammography systems shall be exempt from the requirements of subsection (C) above.

- 4) X-Ray Systems Designed for One Image Receptor Size. Radiographic equipment designed for only one image receptor size at a fixed SID shall be provided with means to limit the x-ray field at the plane of the image receptor to dimensions no greater than those of the image receptor and to align the center of the x-ray field with the center of the image receptor to within two percent of the SID, or shall be provided with means to both size and align the x-ray field such that the x-ray field at the plane of the image receptor does not extend beyond any edge of the image receptor.

b) Radiation Exposure Control Devices

- 1) Timers. Means shall be provided to terminate the exposure at a preset time interval, preset product of current and time, preset number of pulses or preset radiation exposure to the image receptor. Also, it shall not be possible to make an exposure when the timer is set to a zero or off position if either position is provided.

2) X-Ray Control

- A) An x-ray control shall be incorporated into each x-ray system such that an exposure can be terminated by the operator at any time except for:
 - i) Exposures of 0.5 second or less; or
 - ii) During serial radiography when means shall be provided to permit completion of any single exposure of the series in process.
- B) The exposure switch shall be a dead-man switch.

- 3) Automatic Exposure Controls (AEC). Systems which are provided with automatic exposure control devices shall incorporate a back-up timer to terminate the radiation exposure in the event of AEC failure. In addition, they shall meet the following requirements:

- A) Indication shall be made on the control panel when this mode of operation is selected; and
 B) A visible signal shall indicate when an exposure has been terminated by the back-up timer, and manual resetting shall be required before further automatically timed exposures can be made.

- c) Source-Skin Distance (SSD). All mobile or portable radiographic systems shall be provided with means to limit the SSD to 30 centimeters or greater.
 d) Linearity. For equipment that is operated at more than one x-ray tube current setting, the average ratios of exposure (microcoulombs per kilogram or milliroentgens) to the indicated milliamperere-seconds (mAs) product obtained at any two tube current settings utilized shall not differ by more than 0.10 times their sum. This requirement is mathematically represented by the following:

where $\bar{X}(1)$ and $\bar{X}(2)$ are the average microC/kg/mAs or mR/mAs values obtained at any two tube current settings utilized. Compliance shall be determined at any fixed x-ray tube potential within the range of 40 percent to 100 percent of the maximum rated tube potential.

- e) Medical Radiographic Entrance Exposure Limits. The in-air exposure determined for the technique used for the specified average adult patient for routine medical radiography shall not exceed the entrance exposure limits shown below: (See Section 360. Appendix A for measurement protocol and calculation of exposure at skin entrance).

Technique	Thickness		Exposure Limit (mR)
	(cm)	(microC/kg)	
Chest (PA), Grid	23	9	35
Chest (PA), Non-Grid	23	8	30
Abdomen (KUB)	23	155	600
Lumbo-Sacral Spine (AP)	23	206	800
Cervical Spine (AP)	13	52	200
Skull (lateral)	15	65	250
Foot (D/P)	8	26	100

AGENCY NOTE: These exposures are maximums. With careful selection of technique factors, adjustment of film processing systems, and choice of film and screen-film combinations, patient exposures can be further reduced.

(Source: Amended at 17 Ill. Reg. 17972, effective October 15, 1993)

Section 360.70 Mobile/Portable Radiographic Systems Other Than Systems Used Solely For Mammography (Repealed)

(Source: Repealed at 17 Ill. Reg. 17972, effective October 15, 1993)

Section 360.71 Additional Requirements for Facilities Performing Mammography

In addition to the provisions of Sections 360.10, 360.30, 360.40, 360.41, 360.60 and 32 Ill. Adm. Code 400 and 401, the requirements of this Section apply to mammography systems and associated facilities used for mammography.

- a) Physician Supervision. Mammography operations and procedures shall be under the supervision of a physician licensed under the Medical Practice Act of 1987 (Ill. Rev. Stat. 1991, ch. 111, par. 4400) 225 ILCS 60 to practice medicine in all of its branches.

AGENCY NOTE: The individual interpreting clinical images of the breast should be a licensed practitioner of the healing arts trained in the imaging modality being used and should be certified or eligible for certification by either the American Board of Radiology in diagnostic radiology or general radiology or the American Osteopathic Board of Radiology. Facilities performing mammography are encouraged to seek accreditation by the American College of Radiology.

- b) Medical Radiographers Who Perform Mammography. Registrants shall assure that medical radiographers who perform mammography procedures have met the requirements for initial training and continuing education in mammography, as set forth in 32 Ill. Adm. Code 401.160 and 401. Appendix C.
 c) Mammography shall only be performed with a special purpose radiation machine specifically designed for and used solely for mammography procedures.
 d) Mammography systems shall be provided with compression devices parallel to the imaging plane to immobilize and compress the breast. Compression devices shall:

- 1) Be capable of maintaining a compression force of at least 11.3 kilograms (25 pounds) for at least 15 seconds; and
- 2) Not be capable of exceeding a compression force of more than 18.1 kilograms (40 pounds) when used in an automatic or power drive mode.

AGENCY NOTE: Mammography compression devices should be tested at regular intervals to ensure the compression force is adequate but not excessive and that the devices release properly according to the manufacturer's specifications.

- e) Half-Value Layer. Notwithstanding the requirements of Section 360.40(a), the following requirements apply to mammography systems:

- 1) For mammography systems operating at x-ray tube potentials of less than 35 kVp, the half-value layer (HVL) in millimeters of aluminum of the useful beam shall be equal to or greater than the product of the tube potential in kilovolts multiplied by 0.01. Example: If the HVL is measured at a tube potential of 27 kVp, the minimum acceptable HVL is 0.27 millimeter of aluminum.

AGENCY NOTE: Prior to making HVL determinations, the kVp of the useful beam should be measured to verify the accuracy of the indicated kVp values. If a discrepancy exists between measured and indicated values, the measured value

should be used for the calculation of minimum HVL (see also Section 360.40(f)(3)).

- 2) For non-screen-film applications, the half-value layer shall not be less than 1.0 millimeter of aluminum equivalent.

- 3) The half-value layer shall be measured with the compression device in the beam and shall be measured at the same tube potential used in Section 360.Appendix B, Mammography Dose Measurement Protocol and Section 360.Appendix C, Mammography Phantom Image Evaluation.

AGENCY NOTE: If the measured half-value layer is significantly greater than the specified minimum, image contrast will be reduced and overall image quality will be degraded. For screen-film mammography systems, it is recommended that the HVL not exceed the minimum acceptable HVL by more than 0.1 millimeter of aluminium.

- f) Source-Image Receptor Distance. Mammography equipment shall not be operated at any source-image receptor distance less than 50 centimeters.

- g) Focal Spot Size. The nominal focal spot size, as specified by the x-ray tube manufacturer, shall not exceed 0.6 millimeter.

- h) Mammography Exam Dose Limits. (See Section 360.Appendix B for the required measurement protocol.) The mean glandular dose for one craniocaudal view of a 4.5 - centimeter compressed breast (50 percent adipose and 50 percent glandular) shall not exceed:

- 1) 1mGy(100 mrad) for screen-film radiographs not employing the use of grids,
- 2) 3mGy(300 mrad) for screen-film radiographs employing the use of grids, or
- 3) 4mGy(400 mrad) for xerography.

- i) Mammography Exposure Rate. Mammography systems shall have sufficient x-ray output to complete the exposure required for the dose measurement of subsection (h) above within a time of 2.5 seconds or less.

AGENCY NOTE: Mammographic x-ray systems should have means to indicate the milliampere-seconds (mAs) resulting from each exposure made with automatic exposure control.

- j) Mammography Phantom Image Evaluation. Mammography equipment shall be subjected to a phantom image evaluation using the mammography phantom specified in subsection (2) below.

- 1) A phantom image evaluation shall be performed annually as part of the inspection procedure required in 32 Ill. Adm. Code 410.50, using the mammography phantom image evaluation protocol found in Section 360.Appendix C.

A) Phantom images produced during an inspection by a Departmental inspector shall be retained by the Department.

B) Phantom images produced during an inspection by a qualified nondepartment inspector shall be submitted to the Department at the time of submission of inspection reports.

- 2) The mammography phantom used for phantom image evaluation shall be composed of material that is equivalent to a nominal 4.5-centimeter compressed breast of average density (i.e., 50 percent adipose and 50 percent glandular tissue) and shall contain the following objects:

A) Spherical masses, composed of phenolic plastic, with thicknesses of: 2.00, 1.00, 0.75, 0.50 and 0.25 millimeter;

B) Specks, composed of aluminum oxide, with diameters of: 0.54, 0.40, 0.32, 0.24 and 0.16 millimeter;

C) Fibers, composed of nylon, with thicknesses of: 1.56, 1.12, 0.89, 0.75, 0.54 and 0.40 millimeter.

AGENCY NOTE: The Mammographic Accreditation Phantom Model 156, manufactured by Radiation Measurements, Inc., meets the above criteria and was chosen for use by the American College of Radiology's Mammography Accreditation Program.

- 3) Phantom images submitted to the Department shall be labeled with or include as an attachment the following information:

- A) Name of the facility and machine reference number;
- B) Technique factors used to produce the image;
- C) Identification of the film processing equipment;
- D) Date the image was produced; and
- E) Name or inspector identification number of the individual performing the test.

- 4) The mammography system shall be capable of producing images of the mammography phantom in which the following objects are visualized:

- A) The three largest masses with thicknesses of 2.0, 1.0 and 0.75 millimeter.
- B) The three largest speck groups with diameters of 0.54, 0.40 and 0.32 millimeter.
- C) The four largest fibers with thicknesses of 1.56, 1.12, 0.89 and 0.75 millimeter.

- 5) The Department shall evaluate the images produced during mammography phantom image evaluation and shall report the results of the evaluation to the facility.

AGENCY NOTE: The Department will evaluate mammography phantom images using procedures recommended by the American College of Radiology in: American College of Radiology; Mammography Quality Control for Medical Physicists, April 1992.

AGENCY NOTE: A copy of this report is available for public inspection at the Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, Illinois 62704. Copies of this report may also be obtained from the American College of Radiology, 1891 Preston White Drive, Reston, VA 22091.

- k) Quality Assurance. A quality assurance (QA) program shall be established and maintained at each facility performing mammography procedures. The QA program shall include a performance evaluation of the mammographic x-ray machine and the film processor. Each facility shall have available for daily use the mammography phantom specified in subsection (j)(2) above, a densitometer and a sensitometer.

- 1) A diagnostic imaging specialist shall establish and provide administrative oversight over the quality assurance program.

- 2) The quality assurance program shall include but not be limited to the following:

- A) A list of names and qualifications of individuals responsible for:
 - i) Administration of the QA program;
 - ii) Performance of QA tests; and
 - iii) Repairing or servicing the x-ray equipment.

- B) A QA protocol which includes the following:
 - i) A description of the QA tests to be performed;
 - ii) The frequency of each QA test;
 - iii) Criteria of acceptability for each QA test; and
 - iv) A description of actions to be taken if established criteria are not met.
- 3) Quality assurance testing shall include, but not be limited to, the following tests, which shall be performed at the prescribed frequency.
 - A) The film processor shall be subjected to a performance evaluation each day before the processing of clinical or phantom images. Evaluation shall include measurement of temperature and densitometer measurements of sensitometer-exposed film which has been processed in the film processor.
 - B) Mammography systems shall be tested for image quality each calendar month. Image quality testing shall be performed using the mammography phantom specified in subsection (j)(2) above and the mammography phantom image evaluation protocol found in Section 360. Appendix C. In addition, the following requirements apply to image quality testing:
 - i) The individual identified in subsection (1) above shall provide such training as is necessary to the individual assigned to perform phantom image quality evaluation.
 - ii) Image quality testing shall be repeated after any change in or replacement of components of the x-ray machine or film processor which may affect the image quality, as determined by the individual identified in subsection (1) above.
 - iii) Each phantom image produced shall be labeled with the date, technique factors and equipment information if the facility contains more than one mammography machine.
 - iv) The registrant shall assure that the phantom image produced pursuant to this subsection meets the criteria of subsection (j)(4) above.
 - v) Mammography systems not capable of producing a phantom image meeting the criteria of subsection (j)(4) above shall not be used to image human patients until a phantom image has been produced meeting the criteria of subsection (j)(4) above.
- 4) Mobile mammography systems shall be tested using the mammography phantom image evaluation after each relocation and prior to use on patients or shall meet the following requirements:
 - A) A diagnostic imaging specialist shall establish a protocol for measurement of the radiation output of the mammography system, including the radiation measuring device to be used, procedures for performing the measurement and the anticipated result of the measurement.
 - B) Measurements shall be performed using the technique factors that were used for the most recent phantom image evaluation (see subsection (3)(B) above). If a change is made in the technique factors used for the measurements required in this subsection, the image quality shall be tested using the mammography phantom image evaluation protocol found in Section 360. Appendix C. AGENCY NOTE: If the phantom image evaluation is performed using a phototimer, the diagnostic imaging specialist may specify appropriate technique factors that approximate those used by the phototimer for the measurements required in this Section.
 - C) After each relocation of a mobile mammography system, measurements of the radiation output of the machine shall be performed according to the protocol established in subsection (A) above.
 - D) If the radiation output measurement of subsection (C) above exceeds plus or minus 15 percent of the value established by the diagnostic imaging specialist in subsection (A) above, the system shall not be used to image human patients until the cause for the variation has been investigated and corrected.
 - E) Records of radiation output measurements for mobile mammography systems shall be maintained at the location of the mammography system for a period of not less than one inspection cycle (see 32 Ill. Adm. Code 410.60(d)). AGENCY NOTE: The Department recommends that mobile mammography systems be tested for image quality after each relocation and prior to use on patients, with the mammography phantom image evaluation protocol in Section 360. Appendix C.
- 5) A diagnostic imaging specialist shall conduct a review of the quality assurance program each year. Such review shall include evaluation of the results of quality assurance testing. AGENCY NOTE: In addition to the quality assurance testing required in this Section, facilities performing mammography should establish a quality assurance program that provides for analysis of repeated mammography exams, testing of screen-film contact for all cassettes used to produce clinical images, testing of film fogging in the darkroom and measurement of the force applied by the compression device in both manual and power modes (if applicable).
 - I) Records
 - 1) The registrant shall maintain and have available for review at the facility, records of quality assurance testing performed as required in subsection (k) above.
 - A) Records of film processor performance evaluation shall contain the date the test was performed, identification of the person performing the test and the results of the test including densitometry measurements.
 - B) Records of image quality testing shall include the mammography phantom image, labeled with the information required in

subsection (k)(3) above and the results of the mammography phantom image evaluation including the number, type and size of phantom objects visualized.

- C) The registrant shall maintain at the facility, for a period of at least one inspection cycle (see 32 Ill. Adm. Code 410.60(d)), the records specified in subsections (A) and (B) above.
- 2) Unless they are transferred directly to the patient or the patient's physician, mammography images or films shall be retained by the provider of the mammography service for a minimum of 60 months. Mammography images or films transferred to a patient's physician shall be retained by the physician for a minimum of 60 months. These retention periods are a minimum and shall not reduce any other medical record retention requirements established by statute or regulation. AGENCY NOTE: The Department recommends that when a provider of the mammography service transfers mammography films or images to a patient's physician, the physician should be notified of the requirement to retain mammography images for 60 months.

(Source: Amended at 17 Ill. Reg. 17972, effective October 15, 1993)

Section 360.75 Computed Tomography (CT) Systems

a) Requirements for Equipment

1) Termination of Exposure

- A) In the event of equipment failure affecting data collection, means shall be provided to terminate the x-ray exposure automatically, either by de-energizing the x-ray source or by shuttering the x-ray beam, through the use of either a back-up timer or devices which monitor equipment function.
- B) A visible signal shall indicate when the x-ray exposure has been terminated through the means required by subsection (A) above.
- C) The operator shall be able to terminate the x-ray exposure at any time during a scan, or series of scans, of greater than 0.5 second duration.

2) Tomographic Plane Indication and Alignment

- A) Means shall be provided to permit visual determination of the location of a reference plane. This reference plane can be offset from the location of the tomographic planes.
- B) If a device using a light source is used to satisfy subsection (A) above, the light source shall provide illumination levels sufficient to permit visual determination of the location of the tomographic plane or reference plane under ambient light conditions of up to 500 lux (45 footcandles).
- C) The total error in the indicated location of the tomographic plane or reference plane shall not exceed 5 millimeters.
- D) The deviation of indicated scan increment versus actual increment shall not exceed plus or minus 1 millimeter with a typical patient mass resting on the patient support device. The patient support device shall be moved incrementally from a typical starting position to the maximum incremental distance or 30

centimeters, whichever is less, and then returned to the starting position. If the CT system has the capability of variable gantry angles, the compliance measurements shall be performed with the CT gantry positioned at zero degrees.

- 3) Beam-On and Shutter Status Indicators. The CT x-ray control panel and gantry shall provide visual indication whenever x-rays are produced and, if applicable, whether the shutter is open or closed.
- 4) Technique Indicators. The CT x-ray control panel shall provide visual indication of the technique factors, tomographic section thickness and scan increment prior to the initiation of a scan or a series of scans.

b) Facility Design Requirements

- 1) The control panel shall be located behind a protective barrier.
- 2) Communication. Provision shall be made for two-way aural communication between the patient and the operator at the control panel.
- 3) Viewing Systems. Windows, mirrors, closed-circuit television or an equivalent system shall be provided to permit continuous observation of the patient during irradiation and shall be located so that the operator can observe the patient from the control panel.

- c) Radiation dose measurements shall be performed by a diagnostic imaging specialist on each CT x-ray system. Such measurements shall be specified in terms of the multiple scan average dose (MSAD), using a head phantom and the facility's technique factors most frequently used for a CT examination of the head and shall be performed:

- 1) At the time of the inspection required pursuant to 32 Ill. Adm. Code 410 and at intervals specified by a diagnostic imaging specialist and after any change or replacement of components which, in the opinion of the diagnostic imaging specialist, could cause a change in the radiation output;
- 2) With a dosimetry system that has been calibrated within the preceding 12 months. The calibration of such system shall have no more than a three-step (tertiary) calibration, traceable to the National Institute of Standards and Technology; and
- 3) Using the computed tomography dose measurement protocol found in Section 360.Appendix D.

AGENCY NOTE: The Department recognizes that other phantoms and protocols are available to provide accurate dose measurements as specified in this Section. The Department will consider use of such phantoms and protocols as satisfying this Section if the intent of the regulation is met.

- d) Quality assurance procedures shall be conducted on each CT system and shall meet the following requirements:

- 1) The quality assurance procedures shall be in writing and shall have been developed by a diagnostic imaging specialist. Such procedures shall include, but need not be limited to, the following:
- A) Specifications of the tests that are to be performed, including instructions to be employed in the performance of those tests; and
- B) Specifications of the frequency at which tests are to be performed, the acceptable tolerance for each parameter measured and actions to be taken if tolerances are exceeded.

- 2) Quality assurance procedures shall include acquisition of images using a CT phantom which has the capability of providing an indication of the resolution capability of the system.

AGENCY NOTE: The CT phantom used for quality assurance procedures should have the capability of providing an indication of contrast scale, noise, nominal tomographic section thickness, resolution capability of the system for low and high contrast objects and relative densities (CT numbers) for water or other reference material.

- e) The registrant shall maintain at the facility written records of the radiation dose measurements and quality assurance testing performed, as required in subsections (c) and (d) above, for inspection by the Department for a period of at least one inspection cycle (see 32 Ill. Adm. Code 410.60(d)). Such records shall include, but need not be limited to, the following:

- 1) The date of the test and identification of the person performing the test;
- 2) Identification of the type of testing that was performed; and
- 3) Notation of whether the results of the testing were within the parameters established by the diagnostic imaging specialist.

AGENCY NOTE: The Department recommends that the registrant retain the results of quality assurance testing in the form of photographic copies of the images obtained from the image display device or images stored in digital form on a storage medium compatible with the CT x-ray system. Images retained to fulfill the requirements of this subsection should be labeled with the information required in subsections (1) through (3) above.

- f) Operating Procedures. Information shall be available at the control panel regarding the operation of the system. Such information shall include written quality assurance procedures, as required in subsection (d)(1) above.

(Source: Added at 17 Ill. Reg. 17972, effective October 15, 1993)

Section 360.80 Photofluorographic Systems (Repealed)

(Source: Repealed at 17 Ill. Reg. 17972, effective October 15, 1993)

Section 360.90 Dental Radiographic Systems

In addition to the provisions of Sections 360.10, 360.30 and 360.40, the requirements of this Section apply to x-ray equipment and associated facilities used for dental radiography. Refer to Section 360.50 for requirements for dental fluoroscopic systems.

a) General Requirements

- 1) Timers. Means shall be provided to terminate the exposure at a preset time interval, preset product of current and time, preset number of pulses or preset radiation exposure to the image receptor. Also, it shall not be possible to make an exposure when the timer is set to a zero or off position if either position is provided.
- 2) X-Ray Control. An x-ray control shall be incorporated into each x-ray system such that an exposure can be terminated by the operator at any time except for exposures of 0.5 second or less.
- 3) Exposure Switch Arrangement. The exposure switch shall be a dead-man switch and shall be arranged so that the operator can be behind a

protective barrier or at least 1.83 meters (6 feet) from the patient and the tube housing during an exposure.

b) Additional Requirements for Dental Intraoral Systems

- 1) Source-Skin Distance (SSD). X-ray systems designed for use with an intraoral image receptor shall be provided with means to limit the SSD to not less than:
 - A) 18 centimeters if operable above 50 kVp; or
 - B) 10 centimeters if operable at 50 kVp and below.
- 2) Beam Limitation. Radiographic systems designed for use with an intraoral image receptor shall be provided with means to limit the x-ray beam such that the x-ray field, at the minimum SSD, shall be containable in a circle having a diameter of no more than 7 centimeters.
- 3) Dental Radiographic Exposure Limits (Single Film). The entrance exposure to an adult patient for a routine intraoral bitewing exam shall not exceed the limit specified for the kVp used in the table below. Exposures are specified as free-in-air exposures without backscatter.

Tube Potential (kVp) uc	"D" Speed Film (microC/kg) (mR)	"E" Speed Film (microC/kg) (mR)
50	142	72
55	134	65
60	121	57
65	107	49
70	93	43
75	80	36
80	67	30
85	61	27
90	54	25
95	50	22
100	46	18

Linear extrapolation or interpolation shall be used for an x-ray tube potential (kVp) not listed in the table.

AGENCY NOTE: The exposures specified in the above table were empirically determined by a panel of dentists in a U.S. FDA study.

- 4) The kVp shall be measured at the time the entrance exposure is determined pursuant to subsection (3) above to determine the correct exposure limit to be applied.
- c) Beam Limitation Requirements for Dental Extraoral Systems
 - 1) Dental rotational panoramic systems shall be provided with means to limit the x-ray beam to the imaging slit in the transverse axis and shall not exceed a total of 13 millimeters (0.5 inch) larger than the imaging slit in the vertical axis.
 - 2) All other dental extraoral radiographic systems (e.g., cephalometric) shall be provided with means to both size and align the x-ray field so that it does not extend beyond any edge of the image receptor by more than two percent of the SID.
- d) Additional Requirements for Dental Radiography
 - 1) Patient and film holding devices shall be used when the techniques permit;
 - 2) The tube housing and the position indicating device shall not be hand-held during an exposure;
 - 3) The x-ray system shall be operated in such a manner that the useful beam at the patient's skin

does not exceed the criteria specified in subsection (b)(2) above;

- 4) Personnel Protection. The operator shall be behind a protective barrier or be provided with a protective apron of not less than 0.25 millimeter lead equivalent during an exposure. Individuals whose presence is required in the room during an x-ray examination shall be protected from leakage and scatter radiation by protective aprons of not less than 0.25 millimeter lead equivalent or a protective barrier or shall be positioned at a sufficient distance to ensure that the individual does not receive a radiation dose in excess of the limits specified in 32 Ill. Adm. Code 340.310.

AGENCY NOTE: Strict adherence to radiation protection practices should minimize occupational dose and may eliminate the need for individual monitoring. The requirements for individual monitoring are specified in 32 Ill. Adm. Code 340.520.

(Source: Amended at 18 Ill. Reg. 11524, effective July 11, 1994)

Section 360.100 Veterinary Radiographic Systems

In addition to the provisions of Sections 360.10, 360.30 and 360.40, the requirements of this Section apply to x-ray equipment and associated facilities used for radiography with veterinary systems.

- a) Beam Limitation. The useful beam shall be limited to the area of clinical interest. The size of the image receptor used for each radiographic projection shall be consistent with the objectives of the examination.
 - 1) Limitation Criteria. Means shall be provided to limit the x-ray field in the plane of the image receptor so that the field does not exceed each dimension of the image receptor by more than two percent of the SID when the axis of the x-ray beam is perpendicular to the plane of the image receptor.
 - 2) Means shall be provided to align the center of the x-ray field with the center of the image receptor to within two percent of the SID.
 - 3) The requirements of subsection(1) above may be met with:
 - A) An adjustable collimator with a field defining light, meeting the requirements specified in Section 360.60(a)(1); or
 - B) An assortment of removable, fixed-aperture, beam-limiting devices sufficient to meet the requirement for each combination of image receptor size and SID for which the unit is used, with each such device having permanent, clearly legible markings in centimeters and/or inches, to indicate the image receptor size and SID for which it is designed; or
 - C) A beam-limiting device having multiple fixed apertures sufficient to meet the requirement for each combination of image receptor size and SID for which the unit is used. Permanent, clearly legible markings, in centimeters and/or inches, shall indicate the image receptor size and SID for which each aperture is designed and shall indicate which aperture is in position for use.
 - 4) SID Indication
 - A) Means shall be provided to indicate the SID.
 - B) SIDs shall be indicated in centimeters and/or inches and the measured SID shall

correspond to the indicated value to within two percent.

- b) Exposure Switch Arrangement. The exposure control switch shall be arranged so the operator can be at least 1.83 meters (6 feet) from the animal, the x-ray tube and the useful beam.
 - c) Radiation Exposure Control Devices
 - 1) Means shall be provided to terminate the exposure at a preset time interval, preset product of current and time, preset number of pulses or preset radiation exposure to the image receptor. Also, it shall not be possible to make an exposure when the timer is set to a zero or off position if either position is provided.
 - 2) The exposure switch shall be a dead-man switch.
 - d) Veterinary fluoroscopic, computed tomography and therapy systems shall meet the requirements specified in Sections 360.50, 360.75, 360.110 and 360.120, except that the requirements pertaining to aural communication specified in Sections 360.75(b)(2), 360.110(a)(8) and (e)(5) and 360.120(a)(6) and (g)(1)(H), need not be satisfied unless a human is used to hold the animal.
 - e) Additional Requirements for Veterinary X-Ray Systems
 - 1) All individuals whose presence is required during an x-ray examination shall be protected from scatter radiation by protective aprons or gowns of not less than 0.25 millimeter lead equivalent or whole body protective barriers.
 - 2) All exams and retakes shall be ordered by the veterinarian.
 - 3) Unless required to restrain an animal, the operator shall stand at least 1.83 meters (6 feet) away from the useful beam and the animal during radiographic exposures.
 - 4) No individual, other than the operator, shall be in the x-ray room or area while exposures are being made unless such individual's assistance is required.
 - 5) When an animal must be held in position during radiography, mechanical supporting or restraining devices shall be used when technique permits.
 - 6) When a person is required to hold an animal during a radiographic procedure, the individual shall be protected with appropriate shielding devices, such as protective gloves and apron, and the person shall be so positioned that no part of his/her body except hands and arms will be struck by the useful beam.
- AGENCY NOTE: Veterinarians should review 32 Ill. Adm. Code 340.520 to determine if individuals who hold animals will need to use individual monitoring devices.

(Source: Amended at 18 Ill. Reg. 11524, effective July 11, 1994)

Section 360.110 Therapy Systems Operating Below 1 MeV

In addition to the provisions of Sections 360.10 through 360.30, the requirements of this Section apply to x-ray therapy systems and associated facilities operating at energies less than 1 MeV.

- a) Facility Design
 - 1) A therapeutic radiological physicist shall be consulted in the design of an x-ray therapy installation.
 - 2) Shielding requirements
 - A) Each x-ray therapy installation shall be provided with such primary and secondary barriers as are necessary to assure compliance with 32 Ill. Adm. Code 340.

- B) For all x-ray therapy systems capable of operating above 150 kVp installed after October 15, 1993, facility design information shall be submitted to the Department for review prior to installation of the x-ray therapy system. Information submitted to the Department shall include, but need not be limited to, the following:
- Name and address of the planned installation.
 - Name, address and telephone number of the therapeutic radiological physicist who was consulted in the design of the installation.
 - A scale drawing that includes the location of the therapy system, control panel and doors to the room.
 - The structural composition and thickness of all walls, doors, partitions, floor and ceiling of the installation.
 - The occupancy of areas adjacent to the installation.
 - Calculations that demonstrate the adequacy of the amount of shielding specified for each primary and secondary protective barrier.
 - Projected weekly dose rates in areas adjacent to the installation.
- 3) Interlock. X-ray therapy systems operating at greater than 150 kVp shall have an interlock installed on each door of the therapy room. The interlock shall be wired into the electrical circuit in such a manner that when the door is opened, for any reason, the generation of x-rays will automatically be terminated and irradiation can be resumed only by manually resetting the controls on the control panel after the door is closed.
- 4) Doors. The doors to the therapy room shall be designed and installed to allow opening from the inside at all times and shall be capable of being opened manually.
- 5) Warning Lights. X-ray therapy systems operating above 150 kVp, and all therapy rooms to which access is possible through more than one entrance shall be provided with warning lights in a readily observable position near the outside of all access doors. The warning lights shall indicate when the useful beam is on.
- 6) Operator and control position
- X-ray Therapy Systems Operating at 150 kVp and Below. The control panel and operator shall be located either outside the therapy room or behind a protective barrier within the room.
 - X-ray Therapy Systems Operating Above 150 kVp. The control panel and operator shall be located outside the therapy room.
- 7) Viewing System. Windows, mirrors, closed-circuit television or an equivalent system shall be provided to permit continuous visual observation of the patient during irradiation and shall be located so that the operator can observe the patient from the control panel.
- AGENCY NOTE: When the primary viewing system is electronic, a back-up system should be available for use in the event of failure of the

primary system in order to ensure compliance with the requirements of subsection (e)(5) below.

- Communication. The facility design shall permit two-way aural communications between the patient and the operator at the control panel.
- Signs required by 32 Ill. Adm. Code 340.920 shall be posted in the facility.

b) Equipment Requirements

- Leakage Radiation. When the tube is operated at its maximum rated continuous current for the maximum rated tube potential, the leakage radiation shall not exceed the value specified in the table below at the distance specified in the table for the classification of that x-ray system. Radiation measurements shall be averaged over an area up to, but not exceeding, 100 square centimeters.

X-Ray System	Leakage Limit	Measurement Location
Contact Therapy	25.8 microC/kg (0.1 R) per hour	5 centimeters from the tube housing
0 - 499 kVp	258 microC/kg (1 R) per hour)	1 meter from the source
500 kVp - 999 kVp	0.1 percent of useful beam or 258 microC/kg (1 R) per hour, whichever is greater	1 meter from the source

2) Beam-Limiting Devices

- Permanent fixed diaphragms or cones used for limiting the useful beam shall provide the same or a higher degree of protection as required for the tube housing assembly.
 - Removable beam-limiting devices shall, for the portion of the useful beam to be blocked by these devices, transmit not more than one percent of the useful beam at the maximum kilovoltage and maximum treatment filter. This requirement does not apply to auxiliary blocks or materials placed in the useful beam to shape the useful beam to the individual patient.
 - Adjustable beam-limiting devices installed after October 15, 1993 shall meet the requirements of subsection (2)(B) above.
 - Adjustable beam-limiting devices installed on or before October 15, 1993 shall, for the portion of the x-ray beam to be blocked by these devices, transmit not more than five percent of the useful beam at the maximum kilovoltage and maximum treatment filter.
- 3) Filter System. The filter system shall be designed so that:
- The filters are securely positioned and will not become dislodged when the machine is positioned at any possible orientation;
 - The radiation dose at one meter from the filter insertion slot opening does not exceed 258 mC/kg (1 R) per hour when the machine is operated at its maximum current and maximum tube potential;

- C) Each filter is labeled with its composition and thickness (for wedge filters, the wedge angle and maximum design field size shall appear on the wedge or wedge tray);
 - D) If the x-ray therapy system uses changeable filters, there is a filter indication system which permits recognition of any added filter in place and indicates from the control panel the presence of a particular filter or absence of any filter; and
 - E) For x-ray therapy systems installed after October 15, 1993, an interlock prevents irradiation if the selected filter is not installed.
- 4) Tube/Aperture Alignment. The x-ray tube shall be mounted so that it cannot turn or slide with respect to the housing aperture.
- 5) Tube Housing Stability. The tube housing shall remain stable during treatment unless tube housing movement is a designed function of the system.
- 6) Source-Skin Distance (SSD) Indication
- A) Means shall be provided to indicate the SSD.
 - B) The SSD shall be indicated in centimeters and/or inches and the measured SSD shall correspond to the indicated value to within 0.5 percent.
- 7) Timer. A timer, which has a display at the control panel, shall be provided and shall meet the following requirements:
- A) The timer shall be activated with the production of radiation;
 - B) For systems equipped with a shutter mechanism to control irradiation, the timer shall be activated when the shutter is opened;
 - C) The timer shall terminate irradiation when a preselected time has elapsed;
 - D) The timer shall permit presetting and determination of exposure times at least as short as 1 second; and
 - E) The timer shall not permit an exposure if the operator has not selected a time for the exposure.
- AGENCY NOTE: The control panel should be equipped with a count-up timer to serve as a back-up to the control timer.
- 8) Control Panel Functions. The control panel, in addition to the displays required in other provisions of this Section, shall have:
- A) An indication of whether x-rays are being produced;
 - B) A means for indicating x-ray tube potential and current; and
 - C) A means for terminating an exposure at any time.
- 9) Shutters. Equipment that is provided with shutters shall meet the following requirements:
- A) The shutters shall have a lead equivalency not less than that of the tube housing assembly;
 - B) The shutter shall be controlled electrically by the operator at the control panel; and
 - C) An indication of shutter position shall appear at the control panel.
- 10) Multiple Tubes. Control panels capable of energizing more than one x-ray tube shall meet the following requirements:
- A) It shall be possible to energize only one x-ray tube at any time;
 - B) There shall be an indication at the control panel identifying which x-ray tube is energized; and
 - C) There shall be an indication at the tube housing assembly when that tube is energized.
- 11) Low-Filtration X-Ray Tubes. Each x-ray therapy system equipped with a beryllium window shall be clearly labeled as such upon the tube housing assembly and at the control panel.
- c) Radiation Protection Survey. A radiation protection survey shall be performed by a therapeutic radiological physicist on each x-ray therapy system. The registrant shall maintain at the facility a copy of the most recent radiation protection survey report for review by the Department. Radiation protection surveys shall meet the following additional requirements:
- 1) X-ray therapy systems installed after October 15, 1993 shall have a radiation protection survey performed by a physicist before the therapy system is first used for irradiation of a patient.
 - 2) For all x-ray therapy systems, a radiation protection survey shall be performed by a physicist after any change in the x-ray therapy system or facility that might produce a radiation hazard. Such survey shall be performed before the therapy system is used to treat patients.
 - 3) Survey reports shall include, but need not be limited to, the following:
 - A) A diagram of the facility which details building structures and the position of the control panel, x-ray therapy system and associated equipment;
 - B) A description of the x-ray therapy system including the manufacturer, model number and range of kilovolt potential;
 - C) A description of the instrumentation used to determine radiation measurements, including the date and source of the most recent calibration for each instrument used;
 - D) Conditions under which radiation measurements were taken; and
 - E) Survey data including:
 - i) Projected weekly dose equivalent in areas adjacent to the therapy room; and
 - ii) A description of workload, use and occupancy factors employed in determining the projected weekly dose equivalent.
 - 4) The registrant shall retain a copy of the radiation protection survey report and a copy of the report shall be provided to the Department within 30 days after completion of the survey.
 - 5) Any deficiencies detected during the radiation protection survey that would constitute or result in a violation of 32 Ill. Adm. Code 340 shall be corrected prior to using the machine for treatment of patients.
 - 6) The facility shall be operated in compliance with any limitations indicated by the therapeutic radiological physicist as a result of the radiation protection survey required by the Department.
- d) Calibrations and Quality Assurance Checks.
- 1) Each x-ray therapy system installed after October 15, 1993 shall be calibrated by a therapeutic radiological physicist before the therapy system is first used for irradiation of a patient. The calibration

of the x-ray therapy system shall include, but need not be limited to, determination of the following:

- A) The radiation output, expressed as exposure rate in air or dose rate in tissue, as a function of distance, field size, x-ray tube potential and current, filters and treatment applicators used;
 - B) The half-value layer for each kilovoltage setting and filter combination used;
 - C) The degree of congruence between the radiation field and the field indicated by each beam-limiting device; and
 - D) An evaluation of the uniformity of the radiation field.
- 2) Quality assurance checks shall be made by a therapeutic radiological physicist at intervals not to exceed 1 year. Quality assurance checks shall include, but need not be limited to, determination of the following:
- A) The radiation output for a set of operating conditions specified by the therapeutic radiological physicist;
 - B) The coincidence of the radiation field and the field indicated by the beam-limiting device, except for systems equipped with fixed diaphragms or cones; and
 - C) The therapeutic radiological physicist shall establish criteria for quality assurance check measurements and shall determine corrective actions to be implemented if the criteria are exceeded.
- AGENCY NOTE: Quality assurance checks should be performed at a frequency which is appropriate for the particular therapy system, as determined by the therapeutic radiological physicist and based on the history of stability of the radiation output of the machine. A suggested frequency is one that would result in a quality assurance check being performed at least once during a typical patient's course of treatment.
- 3) Whenever service or maintenance is performed on the therapy system, a therapeutic radiological physicist shall be notified and shall determine whether a calibration or quality assurance check is necessary to verify the characteristics of the beam.
- 4) Measurements of the radiation output of the x-ray therapy system shall be performed using a dosimetry system that has been calibrated by a calibration laboratory accredited by the American Association of Physicists in Medicine (AAPM). Calibration of the dosimetry system shall have been performed using a radiation beam of comparable half-value layer to the x-ray system to be calibrated. The dosimetry system shall meet one of the two conditions below:
- A) The calibration of the dosimetry system shall have been performed within the previous 2 years and after any servicing that may have affected the calibration of the dosimetry system; or
 - B) The dosimetry system shall have been calibrated within the previous 4 years and shall have been subjected to a protocol which provides for checks of dosimetry constancy and provides for corrective action when results deviate by more than two percent from the expected values.

- 5) The registrant shall maintain at the facility records of machine calibrations, quality assurance checks and instrument calibrations for inspection by the Department for a period of 5 years. Records to be maintained by the registrant shall include, but need not be limited to, the following:
 - A) Records of machine calibrations and quality assurance checks shall include identification of the x-ray therapy system, radiation measurements, the date the measurements were performed and the signature of the therapeutic radiological physicist who performed the measurements.
 - B) Instrument calibration records shall include the date of the last calibration and identity of the calibration laboratory. If a dosimetry system has been subjected to a protocol as described in subsection (d)(4)(B) above, records shall be maintained that show the date and results of each constancy check performed on the system.
- e) Operating Procedures
 - 1) No x-ray therapy system shall be left unattended unless the system is secured against unauthorized use.
 - 2) When a patient must be held in position for radiation therapy, mechanical supporting or restraining devices shall be used.
 - 3) Other than the patient, no individual shall be in the therapy room unless such individual is protected by a barrier sufficient to meet the requirements of 32 Ill. Adm. Code 340.
 - 4) Other than the patient, no individual shall be in the therapy room during exposures from x-ray therapy systems operating above 150 kVp.
 - 5) The x-ray therapy system shall not be used for treatment of patients unless the operator can maintain visual observation of the patient and audible communication with the patient.
 - 6) On contact therapy systems, a shield of at least 0.5 millimeter lead equivalency at 100 kVp shall be positioned over the entire useful beam exit port during periods when the tube is energized and the beam is not being used.
 - 7) The tube housing assembly shall not be held by hand during operating unless the x-ray therapy system is designed to require such holding and the peak tube potential of the system does not exceed 50 kilovolts. In such cases, the person holding the tube shall wear protective gloves and apron of not less than 0.5 millimeter lead equivalency at 100 kVp.

(Source: Amended at 18 Ill. Reg. 11524, effective July 11, 1994)

Section 360.120 Therapy Systems Operating at 1 MeV or Greater

In addition to the provisions of Sections 360.10 through 360.30, the requirements of this Section apply to particle accelerator systems operating at energies of 1 MeV or greater. Accelerator systems capable of producing radioactive materials in excess of the exempt quantities specified in 32 Ill. Adm. Code 330. Appendix B shall also be licensed pursuant to the provision of 32 Ill. Adm. Code 330.

- a) Facility Design
 - 1) The registrant shall consult a therapeutic radiological physicist in the design of a particle accelerator installation.
 - 2) Shielding Requirements

- A) Each accelerator installation shall be provided with such primary and secondary barriers as are necessary to assure compliance with 32 Ill. Adm. Code 340.
- B) Facility design information for all accelerators installed after October 15, 1993 shall be submitted to the Department for review prior to installation. Information submitted to the Department shall include, but need not be limited to, the following:
 - i) Name and address of the planned installation;
 - ii) Name, address and telephone number of the therapeutic radiological physicist who was consulted in the design of the installation;
 - iii) A scale drawing that includes the location of the accelerator, control panel and doors to the room;
 - iv) The structural composition and thickness of all walls, doors, partitions, floor and ceiling of the installation;
 - v) The occupancy of areas adjacent to the installation;
 - vi) Calculations that demonstrate the adequacy of the amount of shielding specified for each primary and secondary protective barrier; and
 - vii) Projected weekly dose rates in areas adjacent to the installation.
- 3) Interlock. An interlock shall be installed on each door of the therapy room. The interlock shall be wired into the electrical circuit in such a manner that when the door is opened for any reason, the generation of radiation beams will automatically be terminated and irradiation can be resumed only by manually resetting the controls on the control panel after the door is closed.
- 4) Warning lights that indicate when the beam is on shall be provided in a readily observable position near the outside of all access doors to the therapy room.
- 5) Viewing System. Windows, mirrors, closed-circuit television or an equivalent system shall be provided to permit continuous visual observation of the patient during irradiation and shall be located so that the operator can observe the patient from the control panel.
 AGENCY NOTE: When the primary viewing system is electronic, a back-up system should be available for use in the event of failure of the primary system in order to ensure compliance with the requirements of subsection (q)(1)(H) below.
- 6) The facility design shall permit two-way aural communications between the patient and the operator at the control panel.
- 7) Signs required by 32 Ill. Adm. Code 340.920 shall be posted in the facility.
- 8) The control panel shall be outside the therapy room.
- 9) The facility design shall include emergency off buttons, at locations that allow shutting off the machine from inside the therapy room and at the control panel.
- 10) The doors to the therapy room shall be designed to allow opening from the inside at all times and shall be capable of being opened manually.
- b) Equipment Requirements
 - 1) Leakage radiation to the patient area shall be measured for each accelerator. Measurements shall be repeated following maintenance or service performed on the accelerator, as determined by a therapeutic radiological physicist.
 - A) For operating conditions producing maximum leakage radiation, the absorbed dose due to leakage radiation, excluding neutrons, at any point in a circular plane of 2 meters radius centered on and perpendicular to the central axis of the beam at the isocenter or normal treatment distance and outside the maximum useful beam size shall not exceed 0.1 percent of the maximum absorbed dose of the unattenuated useful beam measured at the point of intersection of the central axis of the beam and the plane surface. Radiation measurements shall be averaged over an area up to but not exceeding 100 square centimeters.
 - B) Records of the most recent radiation leakage measurements and the machine parameters used during the survey shall be maintained at the facility for inspection by the Department.
 - 2) Beam-Limiting Devices. Adjustable or interchangeable beam-limiting devices shall transmit no more than two percent of the useful beam at the normal treatment distance for the portion of the useful beam that is to be attenuated by the beam-limiting device. The neutron component of the useful beam shall not be subject to this requirement. This requirement does not apply to auxiliary blocks or materials placed in the useful beam to shape the useful beam to the individual patient.
 - 3) Source-Skin Distance (SSD) Indication
 - A) Means shall be provided to indicate the SSD.
 - B) The SSD shall be indicated in centimeters and/or inches and the measured SSD shall correspond to the indicated value to within 0.5 percent.
 - 4) Filters
 - A) Each filter that is removable from the system shall be clearly marked with an identification number. Documentation available at the control panel shall contain a description of the filter. For wedge filters, the wedge angle and maximum design field size shall appear on the wedge or wedge tray.
 - B) If the machine calibration measurements required by subsection (d) below relate exclusively to operation with an x-ray field flattening filter or electron beam scattering filter in place, such filters shall be removable from the machine only by the use of tools.
 - C) Equipment utilizing a system of wedge filters, interchangeable field flattening filters or interchangeable beam scattering filters shall meet the following requirements:
 - i) The equipment shall have an interlock that prevents irradiation if any filter selection operation carried out in the therapy room is not consistent with the selection of filter, beam type or beam energy at the control panel; and
 - ii) The equipment shall have an interlock system that prevents

- irradiation if any selected filter is not in the correct position.
- 5) Beam Monitoring System. All accelerator systems shall be provided with a beam monitoring system in the radiation head capable of monitoring and terminating irradiation.
- A) Each beam monitoring system shall have a display at the treatment control panel which shall register accumulated monitor units.
- B) The beam monitoring system shall terminate irradiation when the preselected number of monitor units has been detected by the system.
- C) Accelerator systems manufactured after October 15, 1993 shall be equipped with a primary and a secondary beam monitoring system. Each beam monitoring system shall be independently capable of monitoring and terminating irradiation.
- D) For units with a secondary beam monitoring system, the primary beam monitoring system shall terminate irradiation when the preselected number of monitor units has been detected. The secondary beam monitoring system shall terminate irradiation if the primary system fails.
- E) An interlock device shall prevent irradiation if any beam monitoring system is inoperable.
- F) In the event of power failure, the display information required in subsection (b)(5)(A) above, shall be retrievable in at least one system for 20 minutes.
- 6) Beam Symmetry. For equipment equipped with beam bending magnets, the symmetry of the radiation beam in two orthogonal directions shall be monitored before the beam passes through the beam-limiting device. The equipment shall provide means of terminating irradiation automatically if the difference in dose rate between one region and another region exceeds criteria specified by the manufacturer.
- 7) Control Panel
- A) Selection and Display of Monitor Units
- i) Irradiation shall not be possible until a selection of a number of monitor units has been made at the control panel.
- ii) The selected number of monitor units shall be displayed at the control panel until reset.
- iii) After completion of irradiation, it shall be necessary to reset the accumulated beam monitor units before treatment can be restarted.
- B) Termination of Irradiation. It shall be possible to terminate irradiation and equipment movements at any time from the operator's position at the control panel.
- C) Selection of Radiation Type. Equipment capable of both photon and electron therapy shall meet the following requirements:
- i) Irradiation shall not be possible until the radiation type has been selected and displayed at the control panel.
- ii) An interlock shall be provided to ensure that the machine will emit only the radiation type that has been selected.
- iii) An interlock shall be provided to prevent irradiation with x-rays, except to obtain port films, when electron applicators are installed.
- iv) An interlock shall be provided to prevent irradiation with electrons if accessories specific for x-ray therapy are installed.
- D) Section of Radiation Energy. Equipment capable of producing radiation beams of different energies shall meet the following requirements:
- i) Irradiation shall not be possible until a selection of energy has been made at the control panel.
- ii) An interlock shall be provided to ensure that the machine will emit only the nominal energy of radiation that has been selected.
- iii) The nominal value of the energy selected shall be displayed at the treatment control panel.
- E) Selection of Stationary or Moving Beam Therapy. Equipment capable of both stationary and moving beam therapy shall meet the following requirements:
- i) Irradiation shall not be possible unless either stationary therapy or moving beam therapy has been selected at the control panel. The selection of stationary therapy may be performed as a default selection if moving beam therapy is not selected.
- ii) An interlock shall be provided to ensure that the machine will operate only in the mode that has been selected.
- iii) An interlock shall be provided to terminate irradiation if the gantry fails to move properly during moving beam therapy.
- iv) Means shall be provided to prevent movement of the gantry during stationary therapy.
- v) The mode of operation shall be displayed at the control panel.
- F) Timers. A timer shall be provided with a display at the treatment control panel, as a back-up device to the beam monitoring system.
- i) The timer shall permit presetting and determination of exposure times.
- ii) The timer shall be a cumulative timer which activates with the production of radiation and retains its reading after irradiation is interrupted or terminated.
- iii) The timer shall terminate irradiation when a preselected time has elapsed if the beam monitoring system has not previously terminated irradiation. If set at zero, the timer shall not permit irradiation.
- G) Security. The control panel shall be capable of being locked to prevent unauthorized use.
- c) Radiation Protection Survey. A radiation protection survey shall be performed by a therapeutic radiological

physicist on each accelerator. The registrant shall maintain at the facility a copy of the most recent radiation protection survey report for review by the Department. Radiation protection surveys shall meet the following additional requirements:

- 1) For each accelerator installed after October 15, 1993, a radiation protection survey shall be performed by a physicist before the system is first used for irradiation of a patient. The physicist who performs the radiation protection survey shall be a person who did not consult in the design of the accelerator installation (see subsection (a) above) and is not employed by or within any corporation or partnership with the person who consulted in the design of the installation.
 - 2) A radiation protection survey shall be performed by a physicist after any change in the accelerator or facility that might produce a radiation hazard. Such survey shall be performed before the system is used to treat patients.
 - 3) The survey report shall include, but need not be limited to, the following:
 - A) A diagram of the facility which details building structures and the position of the control panel, accelerator and associated equipment;
 - B) A description of the accelerator system including the manufacturer, model number, beam type and beam energy range;
 - C) A description of the instrumentation used to determine radiation measurements, including the date and source of the most recent calibration for each instrument used;
 - D) Conditions under which radiation measurements were taken;
 - E) Survey data including:
 - i) Projected weekly dose equivalent in areas adjacent to the therapy room; and
 - ii) A description of workload, use and occupancy factors employed in determining the projected weekly dose equivalent.
 - 4) The registrant shall retain a copy of the radiation protection survey report and a copy of the report shall be provided to the Department within 30 days after completion of the survey.
 - 5) Any deficiencies detected during the radiation protection survey that would constitute or result in a violation of 32 Ill. Adm. Code 340 shall be corrected prior to using the machine for treatment of patients.
 - 6) The facility shall be operated in compliance with any limitations indicated by the therapeutic radiological physicist as a result of the radiation protection survey.
- d) Machine Calibration. Calibration measurements shall be performed on each accelerator system by a therapeutic radiological physicist before the therapy system is first used for irradiation of a patient. Subsequent calibrations shall be performed at intervals not exceeding 1 year.
- 1) Calibration measurements shall include, but need not be limited to, the following determinations:
 - A) Verification that the equipment is operating in compliance with the design specifications concerning the light localizer, variation in the axes of rotation for the table, gantry and jaw system and the beam flatness and symmetry at the specified depth;
 - B) The absorbed dose rate at various depths in water for the range of field sizes used, for each beam type and energy;
 - C) The uniformity of the radiation field and any dependency upon the direction of the beam;
 - D) Verification that existing depth-dose data and isodose charts applicable to the specific machine continue to be valid or are updated to existing machine conditions; and
 - E) Verification of transmission factors for all accessories such as wedges, shadow trays and compensators, as applicable.
 - 2) Calibration radiation measurements shall be performed using a dosimetry system that has been calibrated by a calibration laboratory accredited by the American Association of Physicists in Medicine (AAPM), and meets the requirements of either subsection (2) (A) or (B) below:
 - A) The calibration shall have been performed within the previous 2 years and after any servicing that may have affected calibration of the dosimetry system; or
 - B) The dosimetry system shall have been calibrated within the previous 4 years and shall have been:
 - i) Compared at annual intervals following the calibration to a dosimetry system with calibration obtained within the previous 2 years from a calibration laboratory accredited by the AAPM, and the results of the comparison indicate the calibration factor has not changed by more than two percent; or
 - ii) Subjected to a testing protocol that has been established by a therapeutic radiological physicist and that provides for checks of dosimetry constancy and provides for corrective action when results deviate more than two percent from the expected values.
 - 3) Calibration of the radiation output of the accelerator shall be performed in accordance with:
 - A) The protocol of Task Group 21, Radiation Therapy Committee, American Association of Physicists in Medicine (AAPM), entitled "A Protocol for the Determination of Absorbed Dose from High-Energy Photon and Electron Beams" published in Medical Physics, Volume 10, pages 741-771 (1983), exclusive of subsequent amendments or editions; or
 - B) The protocol of the Scientific Committee on Radiation Dosimetry of the AAPM, entitled "Protocol for the Dosimetry of X and Gamma Ray Beams with Maximum

AGENCY NOTE: Redundancy is a basic tenet of radiation dosimetry, therefore the therapeutic radiological physicist should establish a program of inter-comparison and constancy testing of calibrated dosimetry instruments to assure, as much as possible, the accuracy, reliability and reproducibility of the measurements performed with those instruments.

Energies Between 0.6 and 50 MeV", published in Physics, Medicine, and Biology, Volume 16, pages 379-396 (1971), exclusive of subsequent amendments or editions; or

- C) Other machine calibration protocols provided that the registrant has submitted the protocols to the Department and the protocols cover the same topics as those contained in subsections (d)(3)(A) and (B), above.

AGENCY NOTE: Copies of the two protocols referenced above are available for public inspection at the Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, Illinois. The protocols may also be obtained directly from the AAPM, One Physics Ellipse, College Park MD 20740-3846.

- 4) The radiation output of each therapy system shall be independently verified at intervals not to exceed 2 years. Independent verification shall consist of:
- A) Verification of the machine output by a therapeutic radiological physicist who is not employed at the facility and does not perform the annual calibration; or
- B) Alternate methods of verification of machine output, such as the use of mailed dosimetry devices, that use devices and procedures approved by the AAPM.
- 5) Machine calibration records shall include identification of the accelerator calibrated, the results of the tests specified in subsection (d)(1) above and shall be signed and dated by the therapeutic radiological physicist who performed the calibration.
- 6) The registrant shall maintain at the facility, for a period of 5 years, records of machine calibrations, instrument calibrations and independent verifications of machine output for inspection by the Department.
- e) Quality Assurance Checks. A quality assurance (QA) check shall be performed by a therapeutic radiological physicist on each therapy system each calendar month. The interval between QA checks shall not exceed 45 days. QA checks shall also be performed after any change which could affect the radiation output, spatial distribution or other characteristics of the therapy beam, as determined by the physicist. Quality assurance checks shall also meet the following requirements:
- 1) Quality assurance checks shall include determination of:
- A) The radiation output for a set of operating conditions specified by a therapeutic radiological physicist; and
- B) The coincidence of the radiation field and the field indicated by the localizing device.
- 2) Radiation measurements shall be obtained using a dosimetry system that:
- A) Meets the requirements of subsection (d)(2) above; or
- B) Has been directly compared by a therapeutic radiological physicist within the previous year with a dosimetry system which meets the requirements of subsection (d)(2) above.
- 3) The therapeutic radiological physicist shall establish criteria for quality assurance check measurements and shall determine corrective

actions to be implemented if the criteria are exceeded.

- 4) The registrant shall retain a record of quality assurance check measurements for inspection by the Department for a period of 5 years. The record shall include the date of the quality assurance check, identification of the accelerator, results of the quality assurance check measurements and the signature of the individual who performed the quality assurance check.
- f) Quality Control. A comprehensive quality control program shall be implemented as specified by a therapeutic radiological physicist and shall meet the following requirements:
- 1) The program shall be designed to test the operation and performance of the accelerator in order to maintain radiation safety and clinical reliability. The program shall include as a minimum the items listed in Section 360. Appendix E.
- 2) The physicist shall specify the tolerance and frequency of performance for each item of the quality control program.
- 3) The physicist shall specify what actions are to be taken for any item exceeding the specified tolerance.
- 4) The physicist shall review, sign and date the results of the quality control program each calendar month. AGENCY NOTE: The elements of a comprehensive quality control program are described in Report No. 13 published by the AAPM, entitled "Physical Aspects of Quality Assurance in Radiation Therapy" (1984). A copy of this report is available for public inspection at the Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, Illinois. Report No. 13 may also be obtained directly from the AAPM, One Physics Ellipse, College Park MD 20740-3846.
- g) Operating Procedures. The registrant shall have a therapeutic radiological physicist establish written operating and emergency procedures and shall ensure that the procedures are implemented before the accelerator is used for treatment of patients. Operators of accelerators shall receive training in the application of the procedures before using the accelerator to irradiate patients. A copy of the current operating and emergency procedures shall be maintained at the treatment control panel for use and review.
- 1) Operating procedures to be implemented shall include instructions that:
- A) The accelerator is used in such a manner that patients, workers and the general public are protected from radiation hazards and the provisions of 32 Ill. Adm. Code 340 are met;
- B) No accelerator shall be left unattended unless it is secured against unauthorized use;
- C) The safety interlock system shall not be used to turn off the beam except in an emergency;
- D) The safety interlocks and warning systems required in subsections (a)(3), (a)(4) and (a)(9) above shall be tested for proper operation at monthly intervals;
- E) Mechanical supporting or restraining devices shall be used when a patient must be held in position for radiation therapy;
- F) No individual other than the patient shall be in the therapy room during irradiation;
- G) Start-up procedures for the accelerator, specified by the therapeutic radiological

physicist, shall be performed daily prior to treatment of patients; and

- H) The accelerator shall not be used for treatment of patients unless the operator can maintain visual observation of the patient and audible communication with the patient.

- 2) Emergency procedures shall include instructions for alternate methods for termination of irradiation and machine movements.

AGENCY NOTE: The operating and emergency procedures should contain as a minimum the machine manufacturer's operations manual for the accelerator.

- 3) Operating and emergency procedures shall include instructions for contacting the therapeutic radiological physicist when operational problems or emergencies occur and the actions that are to be taken until the physicist can be contacted.

- h) Machine Maintenance. The therapeutic radiological physicist shall establish accelerator maintenance procedures that meet the following requirements:

- 1) Whenever service or maintenance is performed on the accelerator, a therapeutic radiological physicist shall be notified of such service or maintenance.
- 2) Following completion of service or maintenance involving radiation beam generation, beam steering or monitoring of the beam, but before the accelerator is again used for treatment of patients, the therapeutic radiological physicist shall review the service or maintenance report and shall determine whether a calibration or quality assurance check is necessary to verify the characteristics of the beam(s). If the therapeutic radiological physicist determines that a calibration or quality assurance check is necessary, the calibration or quality assurance check shall be performed before the accelerator is again used for treatment of patients.
- 3) The therapeutic radiological physicist shall establish the frequency of routine maintenance and ensure that records of all service and maintenance performed on the machine are maintained at the facility.
- 4) The therapeutic radiological physicist shall sign and date records of all service and maintenance performed on the machine.
- 5) The therapeutic radiological physicist shall specify the qualifications of maintenance personnel and prohibit non-qualified personnel from repairing the machine or adjusting parameters on the machine.
- 6) Circuit diagrams of the accelerator and interlock systems shall be maintained at the facility and kept current.

(Source: Amended at 19 Ill. Reg. 8284, effective June 12, 1995)

Section 360.APPENDIX A Medical Radiographic Entrance Exposure Measurement Protocol

The following protocol shall be used for measuring and calculating entrance skin exposures (ESE) for routine diagnostic examinations. Radiation measurements shall be performed with a calibrated radiation measuring device that is sufficiently sensitive to determine compliance with the criteria specified in Section 360.60(e). The instrument shall have been calibrated within the previous 12 months with devices which have no more than a three-step (tertiary) calibration, traceable to the National Institute of Standards and Technology. Patients are not involved in the measurement protocol.

- a) Position the x-ray tube at the source-image receptor distance (SID) routinely used and adjust the collimation to the size routinely used for the examination.
- b) Measure the distance from the x-ray source to the source against which the patient rests. Subtract the thickness of the patient to obtain the source-skin distance (SSD). The standard patient thickness for each projection to be measured shall be the following:

Projection	Thickness (cm)
Chest (PA), Grid	23
Chest (PA), Non-Grid	23
Abdomen (KUB)	23
Lumbo-Sacral Spine (AP)	23
Cervical Spine (AP)	13
Skull (lateral)	15
Foot (D/P)	8

- c) Place a radiation measuring device in the center of the useful beam, measure and record the distance from the source to the device (SDD). Use of a test stand to position the device away from the table will reduce backscatter contribution. Placing the radiation measuring device at the actual source-skin distance (SSD) will accomplish this and allow direct reading of the ESE.
- d) Set the exposure technique as follows:
 - 1) For non-phototimed x-ray systems, set the controls to the exposure technique used by the x-ray operator for the standard patient thickness specified in subsection (b) above.

- 2) For phototimed x-ray systems, set the controls to the exposure technique used by the x-ray operator for the standard patient thickness specified in subsection (b) above, and use one of the two methods below:

- A) Place an appropriate phantom (simulating body attenuation) in the useful beam between the radiation measuring device and the radiographic tabletop; or
- B) Set an appropriate exposure technique in the manual mode (without activation of the phototimer).

AGENCY NOTE: Specifications for appropriate phantoms are included in the American Association of Physicists in Medicine (AAPM) Report No. 31, entitled "Standardized Methods for Measuring Diagnostic X-Ray Exposures" (July 1990).

AGENCY NOTE: A copy of this report is available for public inspection at the Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, IL. Copies of this report may also be obtained from the AAPM, One Physics Ellipse, College Park MD 20740-3846.

- e) Make a radiographic exposure (without patient) and record the reading obtained from the radiation measuring device
- f) Calculate the entrance skin exposure for the specific examination, using the radiation exposure reading from subsection (e) above and the equation below (if a direct result was not obtained with the dosimeter at the SSD):
The entrance skin exposure equals the product of the radiation exposure reading from subsection (e) above multiplied by the square of the ratio of the SDD, to the SSD. This expression is mathematically represented by the equation below (if a direct result was not obtained with the dosimeter at the SSD):

2

$$\text{ESE} = (\text{Dosimeter Reading}) \times \text{SDD/SSD}$$

where: SDD = source-radiation measuring device distance
SSD = source-skin distance

- g) Compare the results of the calculation from subsection (f) above with the criteria specified in Section 360.60(e) to determine compliance.

AGENCY NOTE: There are many different techniques for measuring ESE which may result in significant differences in measured values. Factors that can cause variations include instrument calibration, backscatter, collimation, estimation of focal spot location, choice of phantom, location of dosimeter in the primary beam, etc. Because of these variations, the procedure for determining the ESE should be performed with strict attention to each detail noted above.

(Source: Amended at 18 Ill. Reg. 11524, effective July 11, 1994)

Section 360.APPENDIX B Mammography Dose Measurement Protocol

The technique factors used for performing a mammography examination shall not permit the mean glandular absorbed dose to exceed the limits specified in Section 360.71(h). Radiation measurements shall be performed with an integrating radiation measuring device that is appropriate to the high beam intensity and mammographic kilovoltage peak (kVp) used, and sufficiently sensitive to determine compliance with the criteria specified in Section 360.71(h). The instrument shall have been calibrated within the previous 12 months with devices which have no more than a three-step (tertiary) calibration, traceable to the National Institute of Standards and Technology.

The mammography exam dose limits are based on an average compressed breast value of 4.5 centimeters having an average density (i.e., 50 percent adipose and 50 percent glandular).

Perform the following steps to determine the mean glandular dose to a nominal 4.5-centimeter compressed breast:

- a) Measure and record the x-ray system's useful beam half-value layer (HVL). (See Section 360.71(e).) Any compression device normally in the useful beam during mammography procedures shall be required to be placed between the x-ray tube target and measuring device when determining the HVL. The useful beam shall be collimated to a size encompassing the detector.

AGENCY NOTE: Filters used for the HVL evaluation should be placed as close to the target as practical. The HVL for screen-film mammography should not exceed the minimum acceptable HVL by more than 0.1 millimeter of aluminum equivalent (see Section 360.71(e)), and 1.6 millimeters of aluminum equivalent for xerography.

- b) Determine the glandular dose to entrance exposure factor from the Mammography Dose Evaluation Table (see Section 360.Table A) using the appropriate HVL, kVp and x-ray tube target-filter material.

AGENCY NOTE: The kVp of screen-film mammography systems with molybdenum target-filter combinations should be accurately measured to determine the appropriate glandular dose to entrance exposure factor from Section 360.Table A.

- c) If the equipment has the capability for variable source-image receptor distance, set the craniocaudal source-image receptor distance (SID) for the image receptor system used.

- d) Position in the useful beam any compression apparatus normally used.

AGENCY NOTE: Some mammography systems have the capability of providing automatic adjustment of technique factors through feedback from the position of the compression device. On such systems, the compression device should be lowered to a position 4.5 centimeters above the breast support assembly (BSA). The device should then be removed, inverted and replaced to allow placement of the phantom and measuring device on the BSA below the compression device. If the compression device cannot be replaced in an inverted position, the device should be placed in the beam using auxiliary support.

- e) Placement of the Radiation Measuring Device

- 1) For systems equipped with automatic exposure control (AEC):

- A) Place a properly loaded film cassette in the cassette holder.

AGENCY NOTE: The loaded cassette is placed in the cassette holder to simulate, as much as is possible, the conditions under which actual patient exposures are made. Following radiation measurements, the film should be discarded and the cassette reloaded with unexposed film.

- B) Place a mammography phantom (see the definition for "Mammography phantom" in Section 360.20) on the breast support assembly (BSA). Align the phantom so that the edge of the phantom is aligned with the chest wall side of the BSA and the phantom is over the automatic exposure control device(s).

- C) Place a radiation measuring device in the useful beam so the center axis of the device is parallel to the breast support assembly (BSA). The geometric center of the measuring device shall be positioned 4.5 centimeters above the BSA, 2.5 centimeters from the chest wall edge of the BSA and immediately adjacent to either side of the mammography phantom.

- 2) For systems not equipped with AEC, place a radiation measuring device in the useful beam so that the center axis of the device is parallel to the breast support assembly (BSA). The geometric center of the measuring device shall be positioned so that it is centered 4.5 centimeters above the BSA, 2.5 centimeters from the chest wall edge of the BSA and at the center line of the BSA. (see Section 360.Illustration A). No part of the device's detector area shall be outside of the useful beam.

- f) Collimate the x-ray field to the size normally used and assure that the area covered by the useful beam includes the detector area of the radiation measuring device and the mammography phantom if the equipment is equipped with automatic exposure controls.

- g) Set the appropriate technique factors or automatic exposure controls normally used for a nominal 4.5-centimeter compressed breast.

- h) Measure and record the exposure in air with the radiation measuring device.

- i) Measure and record the time of the exposure required in subsection (h) above. The time for the exposure shall be equal to or less than 2.5 seconds (see Section 360.71(i)).

- j) Calculate the mean glandular dose for a 4.5-centimeter compressed breast by multiplying the measured exposure in millicoulombs per kilogram or in roentgens by the

glandular dose to entrance exposure factor, which was determined using the procedure described in subsection (b) above.

Example: A mammography system is provided with a molybdenum target-filter combination, and the HVL and kVp are determined to be 0.3 and 30, respectively. Therefore, for a 4.5-centimeter compressed breast, the glandular dose to entrance exposure factor from the Mammography Dose Evaluation Table (Section 360.Table A) would be 149 mrad. The measured roentgen output determined in subsection (h) is determined to be 1.8 R. Therefore, the mean glandular dose would be 1.8 R multiplied by 149 mrad/R. This results in a mean glandular dose measurement of 268 mrad. If the image receptor type used was screen-film with grid, the system would be in compliance with Section 360.71(h)(2).

(Source: Amended at 17 Ill. Reg. 17972, effective October 15, 1993)

Section 360.APPENDIX C Mammography Phantom Image Evaluation

Mammography phantom image evaluation shall be performed using the procedure below. The evaluation shall be performed monthly as a part of the quality assurance program and as part of the routine inspection required by 32 Ill. Adm. Code 410. The evaluation shall be performed with the mammography phantom specified in Section 360.71(j)(2).

- a) Equipment necessary for mammography phantom image evaluation includes a densitometer, the mammography phantom and mammographic cassette and film.
- b) Load film in the mammographic cassette according to the manufacturer's instructions.
- c) Place the properly loaded cassette in the cassette holder.
- d) Place the mammography phantom on the breast support assembly (BSA) so that the edge of the phantom is aligned with the chest wall side of the BSA. Align the phantom so that the masses in the phantom are nearest the chest wall edge of the BSA and the fibers in the phantom are away from the chest wall edge of the BSA. If the mammography machine has the capability of automatic exposure control, place the phantom so that the phantom covers the phototimer sensor.
- e) Position the compression device so that it is in contact with the phantom.
- f) Select the technique factors used most frequently in the clinical setting for a 4.5-centimeter compressed breast and make an exposure of the phantom.
- g) Process the film in the processor used for clinical mammography films.
- h) Examine the processed image for areas of non-uniformity of optical density and for the presence of artifacts due to dirt, dust, grid lines or processing.

AGENCY NOTE: If any of the problems noted above are evident on the processed image, the mammography machine film processor and film cassette(s) should be evaluated and the problem corrected. The phantom image evaluation should be repeated after the problem is corrected.

- i) Measure and record the optical density of the film near the center of the phantom image.

AGENCY NOTE: The optical density of the film should be between 1.10 and 1.50. If the density of the phantom image is not in this range, the phantom image may not have enough contrast to visualize the objects necessary to determine compliance with the criteria of Section 360.71(j)(4). Potential causes of film optical density problems include use of improper technique factors and either over-processing or under-processing the film.

- j) Examine the phantom image and count and record the number of masses visualized. Repeat this procedure for the speck groups and the fibrils and record the number of objects visualized. There are a total of 16 imaging objects (5 masses, 5 speck groups and 6 fibrils) in the phantom. Evaluation criteria for objects visualized in the phantom image are in Section 360.71(j)(4). As a minimum, the objects that must be visualized in the phantom image are:

- 1) the masses that are 0.75 millimeter or larger (a total of 3 masses);
- 2) the speck groups that are 0.32 millimeter or larger (a total of 3 speck groups);
- 3) the fibrils that are 0.75 millimeter or larger (a total of 4 fibrils).

AGENCY NOTE: The phantom image should be compared with previous films, including the original phantom image, to determine if subtle changes are occurring from month to month.

(Source: Added at 17 Ill. Reg. 17972, effective October 15, 1993)

Section 360.APPENDIX D Computed Tomography Dose Measurement Protocol

Radiation measurements shall be performed by a diagnostic imaging specialist with a calibrated radiation measuring device that is designed for computed tomography (CT) dose measurements. The radiation measuring instrument shall have been calibrated within the previous 12 months with devices which have no more than a three-step (tertiary) calibration, traceable to the National Institute of Standards and Technology. Measurements shall be specified in terms of the multiple scan average dose (MSAD) and shall be performed with a head phantom specifically designed for making CT dose measurements.

AGENCY NOTE: There are two terms used to describe CT dosimetry measurements, the computed tomography dose index (CTDI) and the multiple scan average dose (MSAD). Manufacturers of CT systems measure and report CTDI pursuant to the requirements of the Code of Federal Regulations, 21 CFR 1020.33(b)(1). While the CTDI is carefully defined, it is difficult to measure accurately. The MSAD is easily measured and was the CT dose descriptor used by the Center for Devices and Radiological Health (FDA) in the Nationwide Evaluation of X-Ray Trends (NEXT). The CTDI is equivalent to the MSAD for a series of 14 contiguous scans spaced by the nominal tomographic thickness. The MSAD was chosen as the dose descriptor for this Part due to the ease of measurement and the applicability of the data generated for comparisons with the results of the NEXT study.

- a) CT dose measurements shall be performed using a head phantom that meets the following requirements:
 - 1) The phantom shall be a right circular cylinder of polymethyl-methacrylate of density 1.19 plus or minus 0.01 grams per cubic centimeter.
 - 2) The phantom shall be at least 14 centimeters in length and shall have a diameter of 16 centimeters.
 - 3) The phantom shall provide means for the placement of a radiation measuring device in the center of the phantom along its axis of rotation.
- b) Set up procedure
 - 1) Place the phantom on the patient support device and in the patient head rest, if available. Center the phantom in the CT gantry aperture and position the gantry so that it is perpendicular to the patient support device. Align the phantom so that the tomographic plane is centered along the axis of the phantom.
 - 2) Make a single scan of the phantom and determine if the center of the phantom is aligned with the axis of rotation of the scanner. If necessary, realign the phantom and repeat this procedure until the center

of the phantom is aligned to within plus or minus 0.5 centimeters of the axis of rotation of the CT scanner.

- 3) Place the radiation measuring device in the center of the phantom.
- c) Exposure measurement
 - 1) Select and record the technique factors and the tomographic section thickness most frequently used for a CT examination of the head.
AGENCY NOTE: If routine CT examinations of the head are performed at the facility using a different tomographic section thickness for the top or bottom part of the head, the larger tomographic section thickness should be used for measurement of the MSAD.
 - 2) Perform a single CT scan and record the exposure reading from the radiation measuring device. Repeat this procedure three times for a total of four scans and determine the average exposure reading for a single scan.

d) Calculation of MSAD

- 1) The MSAD shall be calculated using the mathematical expression below:

$$\text{MSAD} = (E \times f \times K \times L) / T$$

where:

E = average exposure reading in coulombs per kilogram or in milliroentgens.

f = factor to convert exposure in air to absorbed dose in tissue or other attenuating matter, in grays per coulomb per kilogram or in rad per milliroentgen. For acrylic, at an effective energy of 70 KeV, f is equal to 30.2 Gy per C/kg (0.78×10^{-3}) rad/mR.

K = calibration factor to account for the radiation measuring device's response and volume.

L = effective length of the radiation measuring device in millimeters.

T = thickness in millimeters of the tomographic section selected.

AGENCY NOTE: This calculation assumes tomographic sections are contiguous, without overlap of sections or gaps between sections.

EXAMPLE: The measurement is made with an ion chamber with an effective length of 100 millimeters and a calibration factor of 1.99. The thickness of the tomographic section from subsection (c)(1) above is 10 millimeters. The average exposure reading from subsection (c)(2) above is determined to be 306 mR. The MSAD is calculated as follows:

$$\begin{aligned} \text{MSAD} &= (306 \times 0.78 \times 10^{-3}) \times 1.99 \times 100 / 10 \\ \text{MSAD} &= 4.7 \text{ rad} \end{aligned}$$

- 2) If the tomographic sections overlap, the MSAD must be multiplied by a fraction which is the thickness of the tomographic section divided by the scan increment.

EXAMPLE: Calculate the corrected MSAD for scan overlap technique, in a continuation of the above example, assume a scan increment of 5 millimeters.

$$\begin{aligned} \text{Corrected MSAD} &= \text{MSAD} \times (T / \text{scan increment}) \\ \text{Corrected MSAD} &= 4.7 \times (10 / 5) \\ \text{Corrected MSAD} &= 9.4 \text{ rad} \end{aligned}$$

(Source: Added at 17 Ill. Reg. 17972, effective October 15, 1993)

Section 360.APPENDIX E Minimum Quality Control Program for Medical Accelerators

a) Mechanical tests

- 1) Patient support assembly motions
- 2) Gantry angle indicators
- 3) Optical distance indicator
- 4) Alignment lights
- 5) Congruence of radiation beam and light field
- 6) Accuracy of field size indicators
- 7) Mechanical isocenter - gantry and collimator
- 8) Mechanical interlocks

b) Radiation beam tests

- 1) Machine operating parameters
- 2) Dose per monitor unit for x-ray and electron beams
- 3) Dose per degree for moving beam therapy
- 4) Radiation isocenter
- 5) Flatness and symmetry
- 6) Wedge transmission factors
- 7) Shadow tray transmission factors
- 8) Energy check on central axis
- 9) Radiation output versus field size

c) Control panel checks

- 1) Radiation "ON" condition
- 2) Indicator lamp check
- 3) Computer control of accelerator

d) Facility checks

- 1) Patient audio-visual communication
- 2) Entrance door interlock
- 3) Warning lights
- 4) Emergency off buttons

e) Control Panel

- 1) Digital displays
- 2) Analog displays
- 3) Status displays
- 4) Interlock displays
- 5) Reset display

f) Patient Dosimetry Calculations

- 1) Calculation of patient treatment times
- 2) Computer calculations of patient treatment times

(Source: Added at 17 Ill. Reg. 17972, effective October 15, 1993)

Section 360.ILLUSTRATION B Mammography Dose Evaluation Graph (Repealed)

(Source: Repealed at 17 Ill. Reg. 17972, effective October 15, 1993)

Section 360.TABLE A Mammography Dose Evaluation Table

This table is used to determine the mean glandular dose in milligrays delivered by 25.8 mC/kg (or millirad) delivered by 1 R in air incident on a 4.5-centimeter thickness compressed breast of average density (50 percent adipose and 50 percent glandular tissue). Values listed are for the first half-value layer (HVL) in millimeters of aluminum (mm Al), for x-ray tube target-filter combinations of molybdenum/molybdenum (Mo/Mo) and tungsten/aluminum (W/Al). Linear extrapolation or interpolation shall be made for any HVL not listed.

Mean Glandular Dose in milligrays for 25.8 mC/kg (or millirad for 1 R, Entrance Exposure for a 4.5-Centimeter Compressed Breast of Average Density

Ch. II, Sec. 360.TABLE A

1 AGENCY NOTE: Adapted from: Quality Control Manual for Mammography: Medical Physicist's Manual, 1992, American College of Radiology/American Cancer Society.

(Source: Amended at 18 Ill. Reg. 11524, effective July 11, 1994)

Section 360.TABLE B Half-Value Layer as a Function of Tube Potential

X-ray Tube Voltage (kilovolt peak)		Minimum HVL (mm of Al)(1)	
Designed operating range	Measured Operating Potential	Specified Dental Systems (2)	Other X-Ray Systems (3)
Below 50	30	1.5	0.3
	40	1.5	0.4
	49	1.5	0.5
50 to 70	50	1.5	1.2
	60	1.5	1.3
	70	1.5	1.5
Above 71	71	2.1	2.1
	80	2.3	2.3
	90	2.5	2.5
	100	2.7	2.7
	110	3.0	3.0
	120	3.2	3.2
	130	3.5	3.5
	140	3.8	3.8
	150	4.1	4.1

(1) Linear extrapolation or interpolation may be made for an x-ray tube potential (kVp) not listed in Table B above (e.g., in the column entitled "Other X-ray Systems" operated at 20 kVp and 95 kVp, the minimum HVL required would be 0.2 and 2.6 millimeters of aluminum respectively).

(2) "Specified Dental Systems" means any dental x-ray system designed for use with intraoral image receptors and manufactured after December 1, 1980.

(3) "Other X-Ray Systems" means all x-ray systems required to meet the provisions of Sections 360.50, 360.60, 360.75, 360.90 (except "Specified Dental Systems") and 360.100. Half-value layer requirements for mammography systems are specified in Section 360.71(e).

(Source: Amended at 17 Ill. Reg. 17972, effective October 15, 1993)

Section 360.TABLE C Entrance Exposure Limits Per Intraoral Bitewing Film (Repealed)

(Source: Repealed at 17 Ill. Reg. 17972, effective October 15, 1993)

TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

PART 370
USE OF SEALED RADIOACTIVE SOURCES IN
THE HEALING ARTS (REPEALED)

(Source: Repealed at 15 Ill. Reg. 10846; effective July 15 ,1991).

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
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SUBCHAPTER b: RADIATION PROTECTION

PART 380
ANALYTICAL TYPES OF X-RAY EQUIPMENT

Section	
380.10	Scope
380.20	Definition
380.30	Labeling
380.40	Radiation Exposure Standards
380.50	Tests and Inspections
380.60	Operating Procedures and Instructions
380.70	Monitoring

AUTHORITY: Implementing and authorized by the Radiation Protection Act (Ill. Rev. Stat. 1981, ch. 111 1/2, pars. 211 et seq.).

SOURCE: Filed and effective April 20, 1974, by the Department of Public Health; transferred to the Department of Nuclear Safety by P.A. 81-1516, effective December 3, 1980; codified at 7 Ill. Reg. 11280.

Section 380.10 Scope

This Part establishes special requirements for x-ray diffraction units, x-ray spectrographic fluorescence equipment, etc. The provisions of this Part are in addition to, and not in substitution for, other applicable provisions of Department regulations.

Section 380.20 Definition

"Analytical x-ray machines or equipment" means any machine utilizing x-rays for examination of the microscopic structure, or elemental or chemical composition of materials. This includes all types of x-ray diffraction and spectrographic equipment.

Section 380.30 Labeling

- a) A label bearing the words "Caution -- Radiation -- This Equipment Produces Radiation When Energized" shall be placed near any switch which energizes a tube.
- b) A sign bearing the words "Caution -- High Intensity X-Ray Beam", or words having a similar intent, shall be placed in the area immediately adjacent to each tube head. The sign shall be so located that it is clearly visible to any person operating, aligning, or adjusting the unit, or handling or changing a sample.
- c) A clearly visible indication of the presence of an x-ray beam shall be provided on or immediately adjacent to each tube head.
- d) A clearly visible indication of the status (i.e., open or closed) of each shutter shall be provided.

Section 380.40 Radiation Exposure Standards

Radiation exposure to individuals, either within the control area or in the environs of the installation, shall be so controlled that the maximum permissible dose equivalent values, as set forth in 32 Ill. Adm. Code 340, are not exceeded.

Section 380.50 Tests and Inspections

- a) Tests and inspections of all safety devices shall be performed at least monthly to insure their proper operation.

- b) Surveys and monitoring sufficient to insure that operations are conducted safely shall be provided.
- c) Records of tests and inspections, surveys, and monitoring sufficient to show compliance to Department regulations shall be maintained and kept available for inspection by a representative of the Department, upon demand.

Section 380.60 Operating Procedures and Instructions

- a) Individuals having access to analytical x-ray machines or equipment shall be provided with specific written instructions concerning the radiation hazards, safe working practices, and made aware of the symptoms of an acute localized exposure to radiation. These instructions shall be posted near the controls of the x-ray machine(s).
- b) Medical personnel examining work-connected injuries shall be informed of the possibility of radiation exposure to the worker from the devices regulated in this Part.
- c) Operators shall be instructed in the procedures for reporting an actual or suspected radiation overexposure. When it has been determined that an overexposure to an individual has occurred, it shall be reported to the Department without undue delay.
- d) In cases where the primary x-ray beam is not intercepted by the experimental apparatus under all conditions of operation, protective measures shall be provided, such as auxiliary shielding, to avoid exposure to the primary x-ray beam.
- e) If, for any reason, it is necessary to temporarily intentionally alter safety devices, such as bypassing interlocks or removing shielding, such action shall be:
 - 1) specified in writing and posted near the x-ray tube housing so that other persons will know the existing status of the machine; and
 - 2) terminated as soon as possible.
- f) Whenever possible, an interlocking device which prevents the entry of any portion of an individual body or extremities into the primary beam, or causes the primary beam to be shut off upon entry into its path, shall be provided.
- g) Unused tube ports shall be closed in such a fashion that accidental opening is not possible.

Section 380.70 Monitoring

Operators of analytical x-ray equipment shall be provided with finger or wrist radiation monitoring devices if the equipment is not provided with interlocks as specified in Section 380.60(f). Reported exposure or dose values shall not be used for the purpose of determining compliance with

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
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PART 390
PARTICLE ACCELERATORS

Section	
390.10	Scope
390.20	Definitions
390.30	Operating Procedures and Instructions
390.40	Equipment Controls
390.50	Radiation Monitoring
390.60	Radiation Surveys
390.70	Personnel Training

AUTHORITY: Implementing and authorized by the Radiation Protection Act of 1990 (Ill. Rev. Stat. 1991, ch. 111 1/2, pars. 210-1 et seq.) 420 ILCS 40 .

SOURCE: Filed and effective April 24, 1970, by the Department of Public Health; transferred to the Department of Nuclear Safety by P.A. 81-1516, effective December 3, 1980; codified at 7 Ill. Reg. 11278; amended at 18 Ill. Reg. 3143, effective February 22, 1994.

Section 390.10 Scope

Except as otherwise specifically provided, this Part applies to all persons who develop, manufacture, receive, possess, use, own, or acquire accelerators. The provisions of this Part are in addition to, and not in substitution for, other applicable provisions of Department regulations. See 32 Ill. Adm. Code 360 for applicable regulations concerning particle accelerators for medical therapeutic applications.

Section 390.20 Definitions

As used in this Part:

"Accelerator facility" means the location at which one or more particle accelerators are installed within one building or under one roof and are operated under the same administrative control.

"Particle accelerator" means any device other than an x-ray machine which emits ionizing radiation as a result of the acceleration of charged particles. Examples are cyclotrons, betatrons, electron linear accelerators and potential drop accelerators.

"Qualified expert" means an individual who has demonstrated to the satisfaction of the Department that he or she possesses the knowledge and training to measure ionizing radiation, to evaluate safety techniques and to advise regarding radiation protection needs. Satisfactory demonstration of such knowledge and training should include certification by a nationally recognized credentialing entity in the field of radiation protection.

(Source: Amended at 18 Ill. Reg. 3143, effective February 22, 1994)

Section 390.30 Operating Procedures and Instructions

- a) Each registrant shall inform individuals working in or frequenting any portion of a restricted area as to the presence of radiation or particle accelerators; instruct such individuals in safety problems associated therewith and in

precautions or procedures to minimize radiation exposure; instruct such individuals in the provisions of Department regulations for the protection of personnel from exposures to radiation; and advise such individuals of reports of radiation exposure which those individuals may request pursuant to this Part.

- b) Each particle accelerator facility shall be under the administrative control of a radiation protection officer or radiation safety committee who will be responsible for the safe operation of the accelerator.
- c) Written operating and emergency procedures as well as specified safety rules shall be established for each accelerator facility and approved by the radiation protection officer.
- d) Personnel who operate or maintain particle accelerators shall be familiar with and have available a copy of the written operating and emergency procedures.
- e) No individual shall be permitted to operate or maintain an accelerator until such individual has received at least the training specified in Section 390.70.
- f) Modification, repairs or preventive maintenance on accelerator components or safety interlocks may be performed only by or under the direct supervision of individuals who have received at least the training specified in Section 390.70.
- g) Provisions shall be made at each accelerator control console to display the name of the individual who is authorized to operate the accelerator. Only the individual whose name is displayed may turn on the accelerator or open entrances to high radiation areas.
- h) The radiation safety officer shall maintain a current list of all personnel who are qualified to operate or service the particle accelerator.
- i) No registrant shall permit a particle accelerator to operate at any time with a safety interlock bypassed, except for necessary testing. Upon such circumvention of an interlock, the registrant shall maintain records showing the date and reasons for bypassing the interlock. A sign shall be posted at the personnel entrance door being bypassed and this condition terminated as soon as possible.
- j) Additional Requirements. The Department may, by rule, regulation or order impose upon any registrant such requirements in addition to those established in this Part, as it deems appropriate or necessary to minimize danger to public health and safety or property.

(Source: Amended at 18 Ill. Reg. 3143, effective February 22, 1994)

Section 390.40 Equipment Controls

- a) All meters and controls on the accelerator control console shall be clearly identified and easily discernible. Accelerator control consoles shall be equipped with a keyswitch or other device which will render the console inoperative when the key or device is removed. Only one key shall be available to the operating crew.
- b) All entrances into a target room or other high radiation area shall be provided with a minimum of two personnel interlocks.
- c) The interlock system shall be designed to prevent restarting of the accelerator without manually resetting the accelerator "ON" switch at the control console after the tripping of a shielding interlock or a power failure. At the time of such an occurrence, the registrant is required to resurvey the radiation area prior to reactivation of the accelerator. Records documenting the circumstances surrounding such occurrences shall be maintained for review by the Department.

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- d) A scram or panic button or other emergency power cut-off switch shall be located and easily identifiable in all accessible high radiation areas. A visible and/or audible signal system shall be installed within the protective enclosure which will be activated for a reasonable length of time before the power to the accelerator can be activated.
- e) Electrical circuit diagrams of the accelerator and the associated interlock system shall be kept current and on file at each accelerator facility.
- f) All safety and warning devices, including interlocks, shall be checked and appropriately serviced each month. A log and written records of these tests shall be kept by the registrant and made available for inspection by the Department.

(Source: Amended at 18 Ill. Reg. 3143, effective February 22, 1994)

Section 390.50 Radiation Monitoring

- a) Portable radiation monitoring equipment shall be properly maintained and available at the accelerator facility. An appropriate radiation monitor shall be used for all accelerator target rooms and other high radiation areas. This monitor shall be one or more of the following:
 - 1) An area monitor with an easily observable indicator located near the entrance that warns of radiation levels above a predetermined limit;
 - 2) A personal radiation monitor of the "chirpie" type worn while in the room;
 - 3) A portable survey instrument carried into the room; or
 - 4) A monitor approved by the Department.
- b) No registrant shall permit any individual to enter a restricted area unless such individual wears a film badge or thermoluminescent dosimeter (TLD) and a pocket ionization chamber. Pocket ionization chambers shall be capable of measuring doses from zero to at least 51.6 microC/kg (200 mR). A film badge or thermoluminescent dosimeter (TLD) shall be assigned to and worn by only one individual and shall be capable of registering 2.58 mC/kg (10R) or greater.

(Source: Amended at 18 Ill. Reg. 3143, effective February 22, 1994)

Section 390.60 Radiation Surveys

- a) The registrant shall maintain sufficient calibrated and operable radiation survey instruments to make physical radiation surveys as required by the Department. Each radiation survey instrument shall be checked every 3 months and calibrated at intervals not to exceed 1 year. After each instrument servicing, a record shall be maintained of the latest response check or calibration date.
- b) Before a new accelerator with its associated components is placed in routine operation, a radiation protection survey shall be made by a qualified expert and a copy of the results submitted to the Department.
- c) The area surrounding a particle accelerator and associated components shall be surveyed at intervals not to exceed 3 months. A record shall be made of the accelerator operating conditions and radiation levels measured at specific control points. These control points must be well defined and reported on at least four consecutive surveys. One of these control points must be at the normal work station of the individual who operates the accelerator.

These records shall be made available for inspection by the Department.

(Source: Amended at 18 Ill. Reg. 3143, effective February 22, 1994)

Section 390.70 Personnel Training

- a) The registrant shall ensure that all personnel who operate particle accelerators:
 - 1) Receive instruction in the fundamentals of radiation safety including:
 - A) Characteristics of beta, gamma and x-radiation;
 - B) Units of radiation dose equivalent (sievert or rem);
 - C) Hazards of excessive exposure to radiation;
 - D) Levels of radiation from particle accelerators; and
 - E) Methods used to limit radiation doses at the specific facility to be operated, including:
 - i) Shielding;
 - ii) Interlock system;
 - iii) Safety rules; and
 - iv) Radiation monitoring equipment.
 - 2) Receive instruction in the use and care of individual monitoring devices used at the facility.
 - 3) Are knowledgeable of:
 - A) The location and use of all operating controls;
 - B) The pertinent requirements of 32 Ill. Adm. Code: Chapter II, Subchapter b; and
 - C) The registrant's written operating and emergency procedures.
 - 4) Receive at least 11 month of on-the-job training before assuming operational responsibility.
- b) All operator's assistants or helpers shall receive the training listed in subsections (a)(1) through (a)(3) above.

(Source: Amended at 18 Ill. Reg. 3143, effective February 22, 1994)

TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

PART 400
NOTICES, INSTRUCTIONS AND REPORTS TO
WORKERS; INSPECTIONS

Section	
400.10	Purpose and Scope
400.110	Posting of Notices to Workers
400.120	Instructions to Workers
400.130	Notifications and Reports to Individuals
400.140	Presence of Representatives of Licensees or Registrants and Workers During Inspection
400.150	Consultation with Workers During Inspections
400.160	Requests by Workers for Inspections
400.170	Inspections Not Warranted; Informal Review

AUTHORITY: Implementing and authorized by Sections 16 and 29 of the Radiation Protection Act of 1990 (Ill. Rev. Stat. 1991, ch. 111 1/2, pars. 210-16, 210-29) 420 ILCS 40/16 and 29, and Section 5 of the Personnel Radiation Monitoring Act (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 230.15) 420 ILCS 25/5.

SOURCE: Adopted at 10 Ill. Reg. 17496, effective September 25, 1986; amended at 11 Ill. Reg. 15629, effective September 11, 1987; amended at 13 Ill. Reg. 13581, effective August 11, 1989; amended at 16 Ill. Reg. 11531, effective July 7, 1992; amended at 18 Ill. Reg. 3132, effective February 22, 1994.

Section 400.10 Purpose and Scope

- a) This Part establishes requirements for notices, instructions and reports by licensees or registrants to individuals engaged in activities under a license or registration and options available to such individuals in connection with Department of Nuclear Safety (Department) inspections of licensees or registrants to ascertain compliance with the provisions of the Radiation Protection Act of 1990 (Ill. Rev. Stat. 1991, ch. 111 1/2, pars. 210-1 et seq.) 420 ILCS 40 (the Act) and regulations, orders and licenses issued thereunder regarding radiological working conditions.
- b) This Part shall apply to:
 - 1) All persons who receive, possess, use, own or transfer sources of radiation registered with or licensed by the Department pursuant to 32 Ill. Adm. Code: Chapter II, Subchapter b and d.
 - 2) Inspection and testing of radiation machines and associated operating procedures by Departmental inspectors or by qualified nondepartment inspectors whose names are included in the department's record of individuals approved as qualified nondepartment inspectors of radiation machines pursuant to 32 Ill. Adm. Code 410.
 - 3) Inspection of licensed activities by Departmental inspectors.

(Source: Amended at 18 Ill. Reg. 3132, effective February 22, 1994)

Section 400.110 Posting of Notices to Workers

- a) Each licensee or registrant shall post current copies of the following documents:

- 1) The provisions in this Part and in 32 Ill. Adm. Code 340;
 - 2) The certificate of registration, the license, the license conditions and any documents incorporated into the license by reference and amendments thereto;
 - 3) The operating procedures applicable to activities under the license or registration; and
 - 4) Any notice of violation involving radiological working conditions, proposed imposition of civil penalty or order issued pursuant to 32 Ill. Adm. Code 310 and any response from the licensee or registrant.
- b) If the posting of a document specified in subsections (a)(1), (2) or (3) above is not practicable, the licensee or registrant may post a notice which describes the documents and states where they may be examined.
 - c) Department Form KLA.001 "Notice to Employees" shall be posted by each licensee or registrant.
 - d) Department documents posted pursuant to subsection (a)(4) above shall be posted within 5 working days after receipt of the documents from the Department; the licensee's or registrant's response, if any, shall be posted within 5 working days after dispatch from the licensee or registrant. Such documents shall remain posted for a minimum of 5 working days or until action correcting the violation has been completed, whichever is later.
 - e) Documents, notices, or forms posted pursuant to this Section shall appear in a sufficient number of places to permit individuals engaged in work under the license or registration to observe them on the way to or from any particular work location to which the document applies, shall be conspicuous and shall be replaced if defaced or altered.

(Source: Amended at 18 Ill. Reg. 3132, effective February 22, 1994)

Section 400.120 Instructions to Workers

- a) All individuals working in, or the performance of whose duties requires access to any portion of a restricted area:
 - 1) Shall be kept informed of the storage, transfer or use of sources of radiation in such portions of the restricted area;
 - 2) Shall be instructed in the health protection problems associated with exposure to radiation or radioactive material, in the risks of radiation exposure to the embryo and fetus, in precautions or procedures to minimize exposure and in the purposes and functions of protective devices employed;
 - 3) Shall be instructed in, and instructed to observe to the extent within the worker's control, the conditions of the license, the provisions of this Part and 32 Ill. Adm. Code: Chapter II, Subchapters b and d for the protection of personnel from exposures to radiation or radioactive material occurring in such areas;
 - 4) Shall be instructed to report promptly to the licensee or registrant any condition which may constitute, lead to or cause a violation of the Act, the conditions of the license, the provisions of this Part or 32 Ill. Adm. Code: Chapter II, Subchapters b and d or unnecessary exposure to radiation or radioactive material;
 - 5) Shall be instructed in the appropriate response to warnings made in the event of any unusual

occurrence or malfunction that may involve exposure to radiation or radioactive material; and

- 6) Shall be advised as to the radiation exposure reports which workers shall be furnished pursuant to Section 400.130.
- b) These instructions shall be of sufficient detail to avoid radiological health protection problems and shall be given directly to each worker either in writing or in an orientation course, with the workers signing a statement that they have received the above information and understand it.

(Source: Amended at 18 Ill. Reg. 3132, effective February 22, 1994)

Section 400.130 Notifications and Reports to Individuals

- a) Notifications and reports provided to individuals in accordance with this Section shall include data and results obtained pursuant to this Part, orders or license conditions, as shown in records maintained by the licensee or registrant pursuant to 32 Ill. Adm. Code 340.1160(a) and (d). Each notification and report shall:
 - 1) Be in writing;
 - 2) Include the name of the licensee or registrant, the name of the individual and the individual's social security number;
 - 3) Include the individual's dose information; and
 - 4) Contain the following statement:
 "This report is furnished to you under the provisions of the Department of Nuclear Safety Regulations for Radiation Protection (32 Ill. Adm. Code 400). You should preserve this report for further reference."
- b) Each licensee or registrant shall advise each worker annually of the worker's dose as shown in records maintained by the licensee or registrant pursuant to 32 Ill. Adm. Code 340.1160(a) and (d).
- c) At the request of a worker, each licensee or registrant shall furnish to the worker upon termination of employment a report of the worker's dose. Such report shall be furnished within 30 days from the time the request is made, or within 30 days of termination of employment or within 30 days after the individual's dose has been determined by the licensee or registrant, whichever is later. The report shall cover all periods of time in which the worker was required to be monitored pursuant to 32 Ill. Adm. Code 340.520 and shall include the dates and locations of work under the license or registration in which the worker participated.
- d) When a licensee or registrant is required pursuant to 32 Ill. Adm. Code 340.1220, 340.1230 or 340.1240 to report to the Department any dose received by an individual, the licensee or the registrant shall also provide the individual a report of the dose information included therein. Such reports shall be transmitted at a time not later than the transmittal to the Department.
- e) At the request of a worker who is terminating employment with the licensee or registrant in work involving radiation dose during the current year, or of a worker who, while employed by another person, is terminating a work assignment involving radiation dose in the licensee's or registrant's facility during the current year, each licensee or registrant shall provide to each such worker, or to the worker's designee, at termination, a written report regarding the radiation dose received by that worker from operations of the licensee or registrant during the current year or fraction thereof, or provide a written estimate of that dose if the finally-determined personnel monitoring results are not available at that time. Estimated doses shall

be clearly indicated as such. If an estimate of dose is provided, the actual radiation dose records shall be provided to the worker when these records become available to the licensee or registrant.

AGENCY NOTE: The reporting requirements of subsections (b), (c) and (e) above apply only to workers who are required to be monitored pursuant to 32 Ill. Adm. Code 340.520.

(Source: Amended at 18 Ill. Reg. 3132, effective February 22, 1994)

Section 400.140 Presence of Representatives of Licensees or Registrants and Workers During Inspection

- a) Pursuant to Section 400.160 and 32 Ill. Adm. Code 310.50, each licensee or registrant shall afford the Department at all reasonable times the opportunity to inspect such materials, machines, activities, facilities, premises and records as the Department determines are necessary to establish compliance with the requirements of the license and the provisions of 32 Ill. Adm. Code: Chapter II, Subchapters b and d. Reasonable times shall be any time the facility is operational. The inspection may be announced or unannounced. Materials licensees shall be inspected at least as frequently as they would have been inspected by the U.S. Nuclear Regulatory Commission (NRC) if the licensees were regulated by the NRC, but no more frequently than once in a calendar quarter. Radiation machines shall be inspected in accordance with the provisions of Sections 27 and 29 of the Act. Inspection of licensees and radiation machines may be conducted more frequently than once per calendar quarter if, in the past three years, there has been a condition at the facility which required emergency response; or if the Department has received a complaint, the investigation of which will result in a more frequent inspection; or if the Department has documented a violation of the Act or the above referenced rules of the Department at the facility and additional inspections are necessary to establish that the violation has been abated.
- b) During an inspection, Departmental and qualified nondepartment inspectors may consult privately with workers as specified in Section 400.150. The licensee or registrant may accompany Departmental and qualified nondepartment inspectors during other phases of an inspection.
- c) If, at the time of inspection, an individual has been authorized by the workers to represent them during inspections, the licensee or registrant shall notify the Departmental or qualified nondepartment inspectors of such authorization and shall give the workers' representative an opportunity to accompany the inspectors during the inspection of physical working conditions.
- d) Each workers' representative shall be routinely engaged in work under control of the licensee or registrant and shall have received instructions as specified in Section 400.120.
- e) Different representatives of licensees or registrants and workers may accompany the Departmental or qualified nondepartment inspectors during different phases of an inspection if there is no resulting interference with the conduct of the inspection. However, only one workers' representative at a time may accompany the inspectors.
- f) With the approval of the licensee or registrant and the workers' representative, an individual who is not routinely engaged in work under control of the licensee or registrant, for example, a consultant to the licensee or registrant or to the workers' representative, shall be afforded the opportunity to accompany Departmental and qualified

nondepartment inspectors during the inspection of physical working conditions.

- g) Notwithstanding the other provisions of this Section, Departmental inspectors and qualified nondepartment inspectors are authorized to refuse to permit accompaniment by any individual who deliberately interferes with a fair and orderly inspection. With regard to areas containing information classified by an agency of the U.S. Government in the interest of national security, an individual who accompanies an inspector may have access to such information only if authorized to do so. With regard to any area containing proprietary information, i.e., trade secrets and commercial or financial information where such information is privileged or confidential or where disclosure of such information may cause competitive harm, the workers' representative for that area shall be an individual previously authorized by the licensee or registrant to enter that area.

(Source: Amended at 18 Ill. Reg. 3132, effective February 22, 1994)

Section 400.150 Consultation with Workers During Inspections

- a) Departmental and qualified nondepartment inspectors may consult privately with workers concerning matters of occupational radiation protection and other matters related to the activities of the licensee or registrant which bear upon compliance with the conditions of the license or the provisions of this Part or 32 Ill. Adm. Code: Chapter II, Subchapters b and d.
- b) During the course of an inspection, or at any other time, any worker may bring privately to the attention of the Department, its inspectors or qualified nondepartment inspectors, either orally or in writing, any past or present condition which the worker has reason to believe may have contributed to or caused any violation of the Act, the provisions of this Part or 32 Ill. Adm. Code: Chapter II, Subchapters b and d or license condition, or any unnecessary exposure of an individual to sources of radiation under the licensee's or registrant's control. Any such notice in writing shall comply with the requirements of Section 400.160(a). If a worker seeks an opportunity to speak to an inspector during an inspection, the licensee or registrant shall permit the worker such opportunity.
*AGENCY NOTE: The provisions of subsection (b) above shall not be interpreted as authorization to disregard instructions pursuant to Section 400.120.

(Source: Amended at 18 Ill. Reg. 3132, effective February 22, 1994)

Section 400.160 Requests by Workers for Inspections

- a) Any worker or representative of workers believing that a violation of the Act, the provisions of this Part or 32 Ill. Adm. Code: Chapter II, Subchapters b and d, or license conditions exists or has occurred, or that an unnecessary exposure to radiation or radioactive material has occurred in work under a license or registration with regard to radiological working conditions in which the worker is engaged, may request an inspection by giving notice of the alleged violation to the Department. Any such notice shall be in writing, shall set forth the circumstances describing the perceived violation or condition and shall be signed by the worker or representative of the workers. A copy of the notice shall be provided to the licensee or registrant by the Department no later than at the time of inspection except that, upon the request of the worker giving such notice, his

name and the name of individuals referred to therein shall not appear in such copy or on any record published, released or made available by the Department, except for good cause shown, such as when necessary in the course of enforcement actions.

- b) If conditions stated on the face of the complaint indicate there is or has been a violation or the possibility of a violation, the Department shall conduct an inspection as soon as practicable to determine if such alleged violation exists or has occurred. Inspections made pursuant to this Section need not be limited to matters referred to in the complaint.
- c) No licensee or registrant shall discharge or in any manner discriminate against any worker because such worker has filed any complaint or instituted or caused to be instituted any proceedings under this Part or has testified or is about to testify in any such proceeding or because of the exercise by such worker on behalf of himself or others of any option afforded by this Part. Furthermore, each licensee and registrant shall instruct his contractors and subcontractors not to discharge or in any manner discriminate against any worker because such worker has filed any complaint or instituted or caused to be instituted any proceedings under this Part or has testified or is about to testify in any such proceeding or because of the exercise by such worker on behalf of himself or others any option afforded by this Part. Any worker who believes that he has been so discharged or discriminated against may file a complaint with the Department alleging a violation of this subsection.

(Source: Amended at 18 Ill. Reg. 3132, effective February 22, 1994)

Section 400.170 Inspections Not Warranted; Informal Review

- a) Review of Determination That No Inspection is Warranted
 - 1) If the Office of Radiation Safety determines, pursuant to Section 400.160, that an inspection is not warranted, the Office of Radiation Safety shall notify the complainant in writing within 60 days of receipt of the complaint. The complainant may obtain review of such determination by submitting a written statement of position with the Department. The Department will provide the licensee or registrant with a copy of such statement by certified mail, excluding, at the request of the complainant, the name of the complainant. The licensee or registrant may submit an opposing written statement of position with the Department. The Department will provide the complainant with a copy of such statement by certified mail.
 - 2) Upon the request of the complainant or the licensee or registrant, the Department shall hold an informal conference in which the complainant and the licensee or registrant may orally present their views. If such a conference is requested by the complainant, the presence of the licensee or registrant at the conference shall be subject to the concurrence of the complainant. If the conference is requested by the licensee or registrant, the presence or disclosure of the identity of the complainant will be made only pursuant to written authorization from the complainant. After considering all written and oral views presented, the Department shall affirm, modify, or reverse the determination of the Office of Radiation Safety and furnish the complainant and the licensee or registrant a written notification of the decision and the reason therefor.

- b) If the Department determines that an inspection is not warranted because the requirements of Section 400.160(a) have not been met, the complainant shall be notified in writing, within 30 days of receipt of the complaint, of such determination. Such determination shall be without prejudice to the filing of a new complaint meeting the requirements of Section 400.160(a).

(Source: Amended at 13 Ill. Reg. 13581, effective August 11, 1989)

TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

PART 401
ACCREDITING PERSONS IN THE PRACTICE
OF MEDICAL RADIATION TECHNOLOGY

Section	
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APPENDIX B	Example Topics Directly Related to Radiologic Sciences
APPENDIX C	Minimum Training Requirements for Radiographers Performing Mammography

AUTHORITY: Implementing and authorized by Sections 5, 6, 7 and 36 of the Radiation Protection Act of 1990 (P.A. 87-604, effective September 18, 1991).

SOURCE: Adopted at 7 Ill. Reg. 17318, effective January 1, 1984; Emergency amendment at 8 Ill. Reg. 17584, effective September 12, 1984, for a maximum of 150 days; amended at 9 Ill. Reg. 2499, effective February 13, 1985; amended at 10 Ill. Reg. 13259, effective July 28, 1986; amended at 10 Ill. Reg. 21086, effective January 1, 1987; amended at 11 Ill. Reg. 15623, effective September 11, 1987; Emergency amendment at 11 Ill. Reg. 19797, effective November 24, 1987, for a maximum of 150 days; amended at 12 Ill. Reg. 7603, effective April 18, 1988; amended at 12 Ill. Reg. 18164, effective January 1, 1989; amended at 13 Ill. Reg. 15005, effective September 11, 1989; amended at 14 Ill. Reg. 15341, effective September 4, 1990; amended at 15 Ill. Reg. 7054, effective April 29, 1991; amended 16 Ill. Reg. 9115, effective June 2, 1992.

Section 401.10 Policy and Scope

- a) This Part establishes educational standards and an accreditation program applicable to persons who apply ionizing radiation to human beings. Specifically, this Part provides:
 - 1) Minimum standards of preparatory education and experience for persons who apply ionizing radiation to human beings in the disciplines of medical radiography, nuclear medicine technology, radiation therapy technology and chiropractic radiography.

- 2) Examination requirements for certain categories of accreditation.
- 3) Continuing education requirements for renewal of accreditation.
- b) This Part shall apply to any person who applies ionizing radiation to human beings for diagnostic or therapeutic purposes in this State or who otherwise engages in the practice of medical radiation technology in this State unless specifically exempted by the Act or under Section 401.30. This Part shall also apply to persons who are not appropriately licensed under other statutes or regulations and who supervise students for purposes of instructing them while applying ionizing radiation to human beings.
- c) The Board may propose to the Department of Nuclear Safety such regulations as it deems to be appropriate for purposes of fulfilling the policy and scope of the accreditation program.

(Source: Amended at 14 Ill. Reg. 15341, effective September 4, 1990)

Section 401.20 Definitions

As used in this Part, the following definitions shall apply:

"Accreditation" - The process by which the Department of Nuclear Safety grants permission to persons meeting the requirements of this Act and the Department's rules and regulations to engage in the practice of administering radiation to human beings. (Section 4 of the Act)

"Act" - The Radiation Protection Act of 1990 (P.A. 86-1341, effective September 7, 1990).

"Administers Ionizing Radiation" - see "Applies Ionizing Radiation"

"Applies Ionizing Radiation" - The act(s) of using ionizing radiation for diagnostic or therapeutic purposes. Specifically included are those tasks which have a direct impact on the radiation burden of the patient, e.g.: Positioning of the patient, film and beam; preparation, calibration, and injection of radiopharmaceuticals; imaging or laboratory techniques which if performed improperly would result in the re-administration of radiation; selection of technique or treatment parameters.

"Approved Program" - A program which the Department has determined is adequate to prepare students to meet the education requirements prescribed in 42 CFR 75.3 Appendix A, D, and E (1983), exclusive of subsequent amendments or editions. A copy of 42 CFR 75.3 is available for inspection at the Department's offices, 1035 Outer Park Drive, Springfield, IL.

"Board" - The Radiologic Technologist Accreditation Advisory Board (R.T.A.A.B.).

"Chiropractic Radiographic Assistant" - A person other than a licensed practitioner who performs medical radiation procedures and applies x-radiation to the human body for diagnostic evaluation of skeletal anatomy, while under the supervision of a licensed chiropractor.

"Chiropractic Radiography" - The science and art of applying x-radiation to human beings for diagnostic purposes in Chiropractic.

"Credentialing" - Means any process whereby a State government or non-governmental agency or association grants recognition to an individual who meets certain predetermined qualifications.

"Department" - Means the Illinois Department of Nuclear Safety.

"Direct Supervision" - An individual is in the physical presence of a licensed practitioner or medical radiation technologist who holds active status accreditation and assists, evaluates and approves of the individual's performance of the various tasks involved in the application of ionizing radiation.

"Director" - Means the Director of the Department of Nuclear Safety.

"Ionizing Radiation" - Means gamma rays, and x-rays, alpha and beta particles, high speed electrons, neutrons, protons, and other nuclear particles; but not sound or radio waves, or visible, infrared or ultraviolet light.

"In vitro" - Isolated from the living organism.

"In vivo" - Occurring within the living organism.

"Licensed Practitioner" - A person licensed or otherwise authorized by law to practice medicine, dentistry, osteopathy, chiropractic or podiatry.

"Limited Diagnostic Radiographer-Chest" - A person, other than a licensed practitioner, who, while under the supervision of a licensed practitioner, applies x-radiation to the human chest for diagnostic purposes.

"Limited Diagnostic Radiographer-Extremities" - A person, other than a licensed practitioner, who, while under the supervision of a licensed practitioner, applies x-radiation to the human extremities for diagnostic purposes.

"Limited Diagnostic Radiographer-Skull and Sinuses" - A person, other than a licensed practitioner, who, while under the supervision of a licensed practitioner, applies x-radiation to the human skull and sinuses for diagnostic purposes.

"Limited Diagnostic Radiographer-Spine" - A person, other than a licensed practitioner, who, while under the supervision of a licensed practitioner, applies x-radiation to the human spine for diagnostic purposes.

AGENCY NOTE: Specific radiographic examinations appropriate to each type of limited radiography accreditation may be found in Appendix A.

"Medical Radiation Technology" - The science and art of performing medical radiation procedures involving the application of ionizing radiation to human beings for diagnostic and therapeutic purposes. The five specialized disciplines of Medical Radiation Technology are Medical Radiography, Nuclear Medicine Technology, Radiation Therapy Technology, Chiropractic Radiography, and Podiatric Radiography.

"Medical Radiographer" - A person, other than a licensed practitioner, who, while under supervision of a licensed practitioner, applies x-radiation to any part of the human body and who, in conjunction with radiation studies may,

administer contrast agents and related drugs for diagnostic purposes.

"Medical Radiography" - The science and art of applying x-radiation to human beings for diagnostic purposes.

"Nuclear Medicine Technologist" - A person, other than a licensed practitioner, who, administers radiopharmaceuticals and related drugs to human beings for diagnostic purposes, performs in vivo and in vitro detection and measurement of radioactivity and administers radiopharmaceuticals to human beings for therapeutic purposes. A nuclear medicine technologist may perform such procedures only while under the supervision of a licensed practitioner who is licensed to possess and use radioactive materials.

"Nuclear Medicine Technology" - The science and art of in vivo and in vitro detection and measurement of radioactivity and the administration of radiopharmaceuticals to human beings for diagnostic and therapeutic purposes.

"Radiation Therapist" - A person, other than a licensed practitioner, who performs procedures and applies ionizing radiation emitted from x-ray machines, particle accelerators, or sealed radioactive sources to human beings for therapeutic purposes while under the supervision of a licensed practitioner who is licensed, as required, to possess and use radioactive materials.

"Radiation Therapy Technology" - The science and art of applying ionizing radiation emitted from x-ray machines, particle accelerators and sealed radioactive sources to human beings for therapeutic purposes.

"Supervision" - Responsibility for, and control of, quality, radiation safety and protection, and technical aspects of the application of ionizing radiation to human beings for diagnostic and/or therapeutic purposes.

(Source: Amended at 15 Ill. Reg. 7054, effective April 29, 1991)

Section 401.30 Exemptions

- a) Nothing in the Act or this Part shall be construed to limit or affect in any respect, the practice of persons properly licensed under other statutes or regulations with respect to their professions.
- b) The Department shall, upon application therefor or upon its own initiative, grant such exemptions or exceptions from the requirements of this Part as it determines are authorized by law and will not result in a hazard to public health and safety.
- c) Exemptions shall include:
 - 1) A student enrolled in an approved program applicable to his/her profession who, as a part of his/her course of study, applies ionizing radiation to human beings while under the supervision of a licensed practitioner.
 - 2) A person registered with the Department as a student-in-training in limited diagnostic radiography pursuant to Section 401.80(c) who applies ionizing radiation to human beings while under the supervision of a licensed practitioner, provided that the procedures performed shall be limited to the procedures as listed in Appendix A, applicable to the particular status condition of

limited diagnostic radiography for which the student is registered. This exemption shall only apply to individuals who are registered with the Department and shall only apply for 16 months.

- 3) *A person licensed to practice a treatment of human ailments by virtue of the Medical Practice Act of 1987 (Ill. Rev. Stat. 1989, ch. 111, par. 4400-1 et seq.), the Illinois Dental Practice Act (Ill. Rev. Stat. 1989, ch. 111, par. 2301 et seq.), or the Podiatric Medical Practice Act of 1987 (Ill. Rev. Stat. 1989, ch. 111, par. 4801 et seq.) (Section 5 of the Act)*
- 4) A person employed as a dental assistant who performs dental radiography for a licensed dentist.
- 5) A technician, nurse or other assistant who performs radiography under the supervision of a person licensed under the Podiatric Medical Practice Act of 1987.
- 6) A person who holds Conditional Accreditation Type II issued in accordance with Section 401.100(d) during such time as that person is under the direct supervision of a licensed practitioner or medical radiation technologist who holds active status accreditation for purposes of being instructed in the use of equipment and/or procedures other than those for which the person is currently accredited.
- 7) *A nurse, technician, or other assistant who, under the supervision of a person licensed under the Medical Practice Act of 1987, administers radiation to human beings, but only when such administration is performed on employees of a business at a medical facility owned and operated by that business. (Section 6 of the Act)*

(Source: Amended at 15 Ill. Reg. 7054, effective April 29, 1991)

Section 401.40 Application for Accreditation

Any person applying for initial accreditation or renewal of accreditation must submit a complete and legible application form, must pay the appropriate application fee in accordance with Section 401.130, and must provide evidence that he/she has met the requirements for the given category and status of accreditation which is sought. Persons applying for Active Status Accreditation shall submit evidence of registration, Board certification, or other examination as appropriate pursuant to Section 401.70. Persons applying for accreditation in Limited Diagnostic Radiography (i.e., limited-chest, limited-extremities, limited-skull and sinuses and limited-spine) shall submit evidence that they have passed the required examinations as specified in Section 401.60 (d-g). Persons applying for Temporary Accreditation shall submit evidence of graduation from an approved program. Fees and charges collected by the Department shall be paid into the Radiation Protection Fund. Such fees and charges shall be used to defray costs incurred in the administration of this program. Accreditation shall be valid for a specified period of time and shall entitle the individual to privileges consistent with the category and status of accreditation indicated unless the accreditation is suspended or revoked in accordance with Section 401.120.

(Source: Amended at 15 Ill. Reg. 7054, effective April 29, 1991)

Section 401.50 Categories of Accreditation

- a) The Department shall accredit persons in the practice of Medical Radiation Technology in one or more of these specific categories:
 - 1) Medical Radiography;

- 2) Nuclear Medicine Technology;
- 3) Radiation Therapy Technology;
- 4) Chiropractic Radiography; and
- 5) Limited Diagnostic Radiography.

- b) The Department shall recognize the following status conditions for the categories of accreditation:

- 1) Active - An applicant who meets the requirements as set forth in Section 401.100(a).
- 2) Temporary - An applicant who meets the requirements as set forth in Section 401.100(b).
- 3) Conditional - An applicant who meets the requirements as set forth in Section 401.100(c), or (d).
- 4) Limited-Chest - An applicant who meets the requirements as set forth in Section 401.100(e). This status condition is applicable to the category of Limited Diagnostic Radiography only.
- 5) Limited-Extremities - An applicant who meets the requirements as set forth in Section 401.100(e). This status condition is applicable to the category of Limited Diagnostic Radiography only.
- 6) Limited-Skull and Sinuses - An applicant who meets the requirements as set forth in Section 401.100(e). This status condition is applicable to the category of Limited Diagnostic Radiography only.
- 7) Limited-Spine - An applicant who meets the requirements as set forth in Section 401.100(e). This status condition is applicable to the category of Limited Diagnostic Radiography only.

(Source: Amended at 15 Ill. Reg. 7054, effective April 29, 1991)

Section 401.60 Examination Requirements

- a) Active - Persons who seek active status accreditation in medical radiation technology must pass a written examination as appropriate to the category of accreditation sought in accordance with Section 401.70.
- b) Temporary - Persons who seek active status accreditation and are awaiting the successful completion of an examination in accordance with Section 401.70 may apply for and be issued temporary accreditation. Temporary accreditation shall be valid until the person has passed the appropriate examination and has applied for and been issued active status accreditation. In no case shall temporary accreditation be valid for more than two years from the date of issuance.
- c) Conditional - Examination shall not be required for conditional accreditation.
- d) Limited Diagnostic Radiographer-Chest - Persons who seek accreditation to perform radiography of the chest, but not any other parts of the body, must pass a written examination on general radiography topics and a written or practical examination on chest anatomy and clinical skills required to perform radiography of the chest in accordance with Section 401.70(c).
- e) Limited Diagnostic Radiographer-Extremities - Persons who seek accreditation to perform radiography of the extremities, but not any other parts of the body, must pass a written examination on general radiography topics and a written or practical examination on anatomy of the extremities and clinical skills required to perform radiography of the extremities in accordance with Section 401.70(c).
- f) Limited Diagnostic Radiographer-Skull and Sinuses - Persons who seek accreditation to perform radiography of the skull and or sinuses, but not any other parts of the

body, must pass a written examination on general radiography topics and a written or practical examination on anatomy of the skull and sinuses and clinical skills required to perform radiography of the skull and sinuses in accordance with Section 401.70(c).

- g) Limited Diagnostic Radiographer-Spine - Persons who seek accreditation to perform radiography of the spine, but not any other parts of the body, must pass a written examination on general radiography topics and a written or practical examination on anatomy of the spine and clinical skills required to perform radiography of the spine in accordance with Section 401.70(c).

AGENCY NOTE: Persons may seek accreditation in more than one status condition of limited diagnostic radiography.

(Source: Amended at 15 Ill. Reg. 7054, effective April 29, 1991)

Section 401.70 Acceptable Examinations

- a) The Department shall accept for issuance of Active Status Accreditation examinations as identified by this Section. Accreditation shall be specific to the category of examination as specified in subsection (b) of this Section.
- b) Examinations as appropriate to category of accreditation are as follows:

1) Medical Radiography

- A - The American Registry of Radiologic Technologists (R) (A.R.R.T.), or

AGENCY NOTE: Graduation from an approved program as set forth in Section 401.80(a) is a prerequisite for sitting for the A.R.R.T. examination.

- B) The American Registry of Clinical Radiography Technologists (A.R.C.R.T.) provided that the applicant passed the A.R.C.R.T. examination after January 1, 1991, and the applicant has graduated from an approved program as set forth in Section 401.80(a).

2) Nuclear Medicine Technology

- The American Registry of Radiologic Technologists (N) (A.R.R.T.), the Nuclear Medicine Technology Certification Board (N.M.T.C.B.), the American Society of Clinical Pathologists (NM) (A.S.C.P.).

3) Radiation Therapy Technology

- The American Registry of Radiologic Technologists (T) (A.R.R.T.).

4) Chiropractic Radiography

- American Chiropractic Registry of Radiologic Technologists (ACRRT), provided that the examination was administered after June 30, 1984.

- c) Examinations in Limited Diagnostic Medical Radiography - Applicants for accreditation in one or more areas of limited diagnostic radiography shall have passed a written examination on general radiography topics and a written or practical examination specific to the type of limited accreditation sought. All written examinations shall be approved by and scheduled through the Department. The passing score for written examinations shall be a scaled score of 75 percent. All practical examinations shall cover items prescribed by the Department. Practical examinations may be administered by a technologist who holds active accreditation in radiography and is a full-time faculty member of an approved program as defined in Section 401.80 or by a licensed practitioner, certified as a radiologist by the American Board of Radiology, the

American Osteopathic Board of Radiology, or the American Chiropractic Board of Radiology. Practical examinations shall be graded on a pass/fail basis on forms provided by the Department.

- d) For Active Status Accreditation, examinations by other certifying organizations shall be accepted upon written request to the Department, provided that the Department finds that the certifying organization has met the National Commission for Health Certifying Agencies (NCHCA) requirements. (Publication Title: Perspectives on Health Occupational Credentialing) Contract # 232-78-0187, dated September 30, 1979, DHHS Publication No. (HRA) 81-4, U.S. Government Printing Office, Washington, D.C. 20402.

(Source: Amended at 16 Ill. Reg. 9115, effective June 2, 1992)

Section 401.80 Approved Program

- a) The Department shall base its approval of didactic and clinical education for Medical Radiography, Nuclear Medicine Technology, or Radiation Therapy Technology on the standards accepted by the Committee on Allied Health Education and Accreditation (CAHEA). (Specific information concerning these standards is available from the Committee on Allied Health Education and Accreditation of the American Medical Association and from the Department. These standards are entitled: Essentials and Guidelines of an Accredited Education Program for the Radiation Therapy Technologist (1983); Essentials and Guidelines of an Accredited Educational Program for the Radiographer (1983); Essentials of an Accredited Educational Program for the Nuclear Medicine Technologist (1984), and do not include subsequent amendments or editions).
- b) The Department shall base its approval of didactic and clinical education in Chiropractic Radiography on the standards accepted by the Chiropractic Council on Education (CCE), published January 27, 1985, exclusive of subsequent amendments or editions. Specific information concerning these standards is available from the Department or from the Chiropractic Council on Education, 3209 Ingersoll Avenue, Des Moines, Iowa 50312. Student exemption for persons enrolled in an approved Chiropractic Radiography program shall not exceed 12 months.
- c) The Department shall base its approval of didactic and clinical education in Limited Diagnostic Radiography on standards contained in the "Curriculum Guide for Limited Permittee Programs", June 1987, exclusive of subsequent amendments or editions. Copies of these standards are available from the American Society of Radiologic Technologists, 15000 Central Avenue South East, Albuquerque, New Mexico, 87123. Students-in-training in Limited Diagnostic Radiography shall be registered with the Department on forms provided by the Department. Registration with the Department shall include application and payment of applicable fees for examination. Students-in-training in Limited Diagnostic Radiography shall not begin application of ionizing radiation to humans prior to the Department's approval of the student's proposed training as identified through the student-in-training registration process. The Department shall refuse to register an individual as a student-in-training when the party(s) responsible for the training of said student has demonstrated poor training of students as evidenced by either a cumulative failure rate in excess of 50 percent of the trainer's students or two consecutive students who fail the examinations specified in Section 401.70(c). If the

employer is not identified as the party responsible for training the student, the Department shall register an individual as a student-in-training in the employer's practice only if the student is concurrently enrolled in a program that meets the minimum requirements for a training program in limited radiography established by the Joint Review Committee on Education in Radiologic Technology, published 1990, by the Joint Review Committee on Education, 20 N. Wacker Drive, Suite 900, Chicago, Illinois 60606-2901. Students-in-training in Limited Diagnostic Radiography shall take the appropriate written or written and practical examinations not later than the eight month of training. Students shall not perform radiographic procedures beyond the 16 months of training unless the required examinations have been passed.

(Source: Amended at 15 Ill. Reg. 7054, effective April 29, 1991)

Section 401.90 Practice Requirement - Initial Licensure (Repealed)

(Source: Repealed at 9 Ill. Reg. 2499, effective February 13, 1985)

Section 401.100 Initial Issuance of Accreditation

- a) The Department shall issue Active Status Accreditation in a category of medical radiation technology to persons who have passed an examination as indicated in Section 401.70(b). Active Status Accreditation issued after January 1, 1988, shall be valid for two years from the date of issuance.
- b) The Department shall issue Temporary Accreditation in a category of medical radiation technology and chiropractic radiography to persons who are awaiting an examination in accordance with Section 401.70(b) and have completed an approved program. Applicants for Temporary Accreditation must provide specific evidence of the intent to take such an examination, the category of examination to be taken, and the date on which the examination will be taken. Temporary Accreditation shall convey the same rights as the Active Status Accreditation for which the individual is awaiting examination. Temporary Accreditation shall be valid until such time as the individual successfully completes the appropriate examination and applies for and is issued Active Status Accreditation in accordance with subsection (a), but in no instance longer than twenty-four (24) months from the date of issuance for medical radiation technology and no longer than twelve (12) months from the date of issuance for chiropractic radiography.
- c) The Department shall issue Conditional Accreditation Type I in a category of medical radiation technology upon determining that community hardship exists. When making a determination of the existence of community hardship, the Department will consult Health Systems Agencies or County or Local Health Departments, and will evaluate the availability of alternative radiology services and trained personnel. In addition, the Department shall require the applicant's employer or prospective employer to demonstrate that recruitment of qualified personnel, at competitive compensation, has been attempted and unsuccessful. Such demonstration can take the form of documented advertising in publications intended to reach radiologic technologists. If based on the information submitted, the Department determines that qualified personnel cannot be recruited, and that the people in the locality in which the conditional accreditation is sought would be denied adequate health care because of the

unavailability of appropriately accredited persons, the Department shall issue Conditional Accreditation Type I which shall be valid for a period of twenty-four (24) months from the date of issuance.

- d) The Department shall issue Conditional Accreditation Type II in a category of medical radiation technology to any person who, twenty-four (24) months prior to July 1, 1989, was employed in medical radiation technology and who otherwise does not meet the qualifications for accreditation. Conditional accreditation issued pursuant to this Section shall be valid for two years from date of issuance. Issuance shall be contingent upon submitting a written Statement of Assurance that the person is competent to apply ionizing radiation to human beings. A Statement of Assurance submitted to the Department in accordance with this Section shall specify the nature of the equipment and procedures which the individual is competent to utilize. The Statement of Assurance must be provided by a licensed practitioner under whose supervision the individual is employed or has been employed at some time within the last twelve months. Conditional accreditation which is issued pursuant to this Section shall be specific to the procedures and equipment indicated in the Statement of Assurance. An individual who is accredited in accordance with this Section may expand the accreditation to additional procedures and/or equipment by receiving training in accordance with Section 401.30(c)(3). After such training, the individual may submit an additional Statement of Assurance from a licensed practitioner under whose supervision the individual is employed as to the additional equipment and procedures which the individual is competent to utilize. However, an individual may not become accredited pursuant to the provisions of this Section for equipment or procedures outside of those in the category of initial accreditation. Nothing in this Section should be interpreted to limit an individual's right to make application for and be issued Active Status Accreditation in accordance with subsection (a). The Department shall not issue Conditional Accreditation Type II as provided by this Section after September 7, 1990. However, Conditional Accreditation Type II issued on or before September 7, 1990, is renewable in accordance with Section 401.140.
- e) The Department shall issue accreditation in one or more areas of Limited Diagnostic Radiography to persons who have passed examinations as indicated in Section 401.70(c). Such accreditation shall be valid for two years from the date of issuance.

(Source: Amended at 15 Ill. Reg. 7054, effective April 29, 1991)

Section 401.110 Duration of Accreditation

- a) The duration of initial issuance of Active Status Accreditation, regardless of the category of medical radiation technology, shall be two (2) years. Active Status Accreditation shall be renewable for periods of two years in accordance with meeting the requirements in Section 401.140.
- b) The duration of Temporary Accreditation shall not exceed two years for the categories of Radiography, Nuclear Medicine Technology, or Radiation Therapy Technology and shall not exceed one year for Chiropractic Radiography. Temporary Accreditation shall not be renewed.
- c) The duration of initial issuance of Conditional Accreditation Type I shall be two years and shall be

renewable thereafter for periods of two years. Such renewal shall be based on a re-evaluation by the Department of a condition of community hardship and meeting the requirements of Section 401.140.

- d) The duration of initial issuance of Conditional Accreditation Type II shall be two years. This accreditation shall be renewable for periods of two years in accordance with meeting the requirements in Section 401.140. The renewed accreditation shall be specific to the procedures and equipment indicated in the most recent Statement of Assurance which has been presented to the Department in accordance with Section 401.100(d).
- e) The duration of initial issuance of accreditation in Limited Diagnostic Radiography shall be two years. This accreditation shall be renewable for periods of two years in accordance with meeting the requirements in Section 401.140.
- f) The expiration date of a renewed accreditation that has been renewed on or before the expiration of the previous accreditation shall be two years from the expiration date of the previous accreditation. For renewal of accreditation that has lapsed, or that has been surrendered, the expiration shall be two years from the last day of the month in which the application for renewal is processed.

(Source: Amended at 16 Ill. Reg. 9115, effective June 2, 1992)

Section 401.120 Suspension and Revocation of Accreditation

- a) The Department shall act to suspend or revoke an individual's accreditation for any one or a combination of the following causes:
 - 1) Knowingly causing a material misstatement or misrepresentation to be made in the application for initial accreditation or renewal of accreditation if such misstatement or misrepresentation would impair the Department's ability to assess and evaluate the applicant's qualifications for accreditation under this Part;
 - 2) Wilfully evading the statute or regulations pertaining to accreditation, or wilfully aiding another person in evading such statute or regulations pertaining to accreditation;
 - 3) Having been convicted of a crime which is a felony under the laws of this State or conviction of a felony in a federal court, unless such individual demonstrates to the Department that he/she has been sufficiently rehabilitated, by restoration of all civil rights, to warrant the public trust;
 - 4) Exhibiting significant or repeated incompetence in the performance of professional duties;
 - 5) Having a physical or mental illness or disability which results in the individual's inability to perform professional duties with reasonable judgment, skill and safety;
 - 6) Continuing to practice medical radiation technology when knowingly having a potentially serious disease, such as those listed in 77 Ill. Adm. Code 690.100, which could be transmitted to patients;
 - 7) Repeatedly using alcohol, narcotics or stimulants to such an extent as to impair the performance of professional duties;
 - 8) Having had a similar credential by another state or the District of Columbia suspended or revoked if the grounds for that suspension or revocation are the same or equivalent to one or more grounds for suspension or revocation as set forth herein.

- b) If, based upon any of the above grounds, the Department determines that action to suspend or revoke accreditation is warranted, the Department shall notify the individual and shall provide an opportunity for a hearing in accordance with 32 Ill. Adm. Code 200.60. An opportunity for a hearing shall be provided before the Department takes action to suspend or revoke an individual's accreditation unless the Department finds that an immediate suspension of accreditation is required to protect against immediate danger to the public health or safety (Ill. Rev. Stat. 1985, ch. 111 1/2, par. 222), in which case the Department shall suspend an individual's accreditation pending a hearing.
- c) If the Department finds that removal of accreditation is warranted, the usual action shall be a suspension of accreditation for up to one year. The term of suspension may be reduced by the Director, upon the recommendation of the hearing officer, if the hearing officer finds, based upon evidence presented to him/her at a hearing, that the conditions leading to the Preliminary Order for Suspension can be cured in less than one year. However, if the Department finds that the causes are of a serious or continuous nature, such as past actions which posed an immediate threat to public health or safety or deficiencies that cannot be cured within one year, the Department shall revoke the individual's accreditation.
- d) When an individual's accreditation is suspended or revoked, the individual shall surrender his/her credential to the Department until the termination of the suspension period or until reissuance of the accreditation.
- e) An individual whose accreditation has been revoked may seek reinstatement of accreditation by filing a petition for reinstatement with the Department which complies with the requirements of 32 Ill. Adm. Code 200.40. Such petition may be filed one year or more after the beginning of the revocation period. The individual shall be afforded a hearing in accordance with 32 Ill. Adm. Code 200 and shall bear the burden of proof of establishing that the accreditation should be reinstated due to rehabilitation or other just cause.

(Source: Amended at 10 Ill. Reg. 21086, effective January 1, 1987)

Section 401.130 Fees

- a) The fees for accreditation in all categories shall be non-refundable and shall be as follows:
 - /b
 - /b
 - 1) Initial Accreditation - Active, Conditional, Temporary or Limited Status:
/b\$40.00 per application
 - 2) Renewal of Accreditation - Active, Conditional, or Limited Status:
/b\$40.00 per application
- b) Examination fee for Limited Diagnostic Radiography Accreditation shall be \$30.00.
- c) The appropriate fees are to accompany the application when filing with the Department. An application is filed on the date that it is received by the Department or on the date that it is postmarked by the United States Postal Service, whichever is earlier.

(Source: Amended at 16 Ill. Reg. 9115, effective June 2, 1992)

Section 401.140 Requirements for Renewal of Accreditation

a) Prerequisites

- 1) An individual must make application for renewal of accreditation on or before the expiration date of the accreditation. Accreditation shall lapse if not renewed within this time period. An individual may not legally perform medical radiation technology without valid accreditation, or without the expressed approval of the Department during such time as an application may be pending. Such approval shall be limited to the applicant who meets all requirements for initial accreditation and requires additional time for the filing of continuing education records. The duration of such approval shall not exceed 90 days. Nothing in this Section shall be interpreted to preclude an individual from seeking the renewal of lapsed accreditation.
- 2) Each applicant shall submit a complete and legible application with the fee for renewal of accreditation in accordance with Section 401.130. Submission of an application for renewal shall hold the prior accreditation valid until such time as the Department acts to grant or deny renewal of accreditation. The Department will grant or deny renewal of accreditation within ninety (90) days of receipt of application for renewal.

b) Continuing Education Requirements

All applicants for renewal of accreditation, regardless of the category or status of accreditation sought to be renewed, must provide evidence of having participated in an approved program of continuing education as indicated below:

- 1) The required effort in continuing education per year for each category of medical radiation technology, applicable to each year elapsed since the most recent date of issuance of accreditation, not to exceed two years beyond the expiration of the last accreditation, is as follows:

A) Radiography	12 units
B) Nuclear Medicine Technology	12 units
C) Radiation Therapy Technology	12 units
D) Chiropractic Radiography	12 units
E) Limited Diagnostic Radiography	6 units

2) An applicant who:

- A) surrenders his/her accreditation shall meet the requirements set forth in subsection (b)(1) but shall not be held responsible for continuing education for the period beyond the date when such accreditation was surrendered.
- B) can provide evidence that he/she has not been employed to perform radiation procedures in this State during periods of lapsed accreditation shall not be held responsible for continuing education for periods of such lapsed accreditation but shall be responsible for continuing education requirements accrued during the period for which the most recent accreditation was valid.
- C) applies for renewal of accreditation and meets either provision in subsection (b)(2)(A) or (b)(2)(B) shall have completed 12 of the hours of continuing education required by subsection (b)(1) for renewal within one year preceding the application for renewal or within 90 days after the submission of the application, if approved

by the Department. Such approval by the Department shall be granted only for reasons of deficient continuing education.

- 3) The continuing education effort may be averaged during the period to which the requirement applies and shall be prorated by month. Individual courses may be applicable to more than one category of accreditation. The Department will base its approval on the relevance of the course work or training to the category or categories of current accreditation. In establishing relevancy, the Department will use standards such as are accepted by Verification of Involvement in Continuing Education (V.O.I.C.E.), Evidence of Continuing Education (E.C.E.), Continuing Medical Education (C.M.E.), and Continuing Education Units (C.E.U.). The Department will also accept relevant course work from accredited colleges and universities to satisfy this requirement.
- 4) Credit for continuing education other than as indicated above shall be granted by the Department if the individual or activity sponsor seeks approval of the course or activity and the Department finds that the course or activity will be consistent with courses approved in accordance with subsection (b)(1).
- 5) The basis for a unit of continuing education credit shall be the contact hour (50 minutes) of lecture. Activity other than lecture shall be approved for credit by the Department based upon the standards of subsection (b)(3).
- 6) In each category of accreditation the applicant for renewal shall have completed a minimum of 6 units of continuing education for each year elapsed since the most recent date of issuance of accreditation, not to exceed two years beyond the expiration of the most recent accreditation, in continuing education in subject matter directly related to radiologic sciences in the applicant's specific category of accreditation. The balance of the requirement may be accomplished either in subject matter directly related to radiologic sciences or in subject matter directly related to patient care in the radiologic environment.
AGENCY NOTE: Applicants may refer to 401.Appendix B for examples of specifically related continuing education subjects by category.

c) Nonrenewal of Accreditation

- 1) The Department shall not renew an individual's accreditation if he/she fails to present satisfactory evidence that he/she possesses the necessary qualifications for accreditation, and that he/she has participated in an approved continuing education program in accordance with this Part.
- 2) If the Department does not find satisfactory evidence that the individual meets these requirements, the Department shall, within ninety (90) days of receipt of the application for renewal of accreditation, send the individual a Notice of Intent Not to Renew Accreditation. This notice shall include the area(s) of deficiency and the individual's rights as set forth in this Section.
- 3) The individual may, within fifteen (15) days of the date of receipt of the Notice of Intent Not to Renew Accreditation, resubmit an application for renewal of accreditation which provides additional information to the Department in order to establish that the identified area(s) of deficiency have been met or corrected. The Department shall act upon

such resubmission within thirty (30) days of receipt. Submission of such an application shall hold the prior accreditation valid until the Department acts on the application.

- 4) After receipt of a Notice of Intent Not to Renew Accreditation in accordance with subsections (c)(2) or (c)(3), the individual may request a hearing. Such request must be made within thirty (30) days of the date of receipt of the Notice of Intent Not to Renew Accreditation. The hearing shall be held in accordance with 32 Ill. Adm. Code 200, except that the applicant shall have the burden of proof of establishing that he/she has met the necessary qualifications for renewal of accreditation. Submission of a request for a hearing shall hold the prior accreditation valid until the individual's receipt of a decision pursuant to the hearing.
- 5) If the applicant does not request a hearing within thirty (30) days of receipt of a Notice of Intent Not to Renew Accreditation in accordance with subsections (c)(2) or (c)(3), the Department shall issue a Notice of Nonrenewal.
- 6) An individual's current credential shall be invalid as of the date of his/her receipt of a Notice of Nonrenewal pursuant to subsection (c)(5) or a decision issued after a hearing in accordance with subsection (c)(4).
- 7) If an individual's accreditation is not renewed, he/she shall have the right at any time to submit an application for renewal of accreditation. Such application shall be reviewed and processed in accordance with the requirements of this Section except that an individual may not legally apply ionizing radiation to human beings until and unless the Department has acted to grant such application for renewal of accreditation.

(Source: Amended at 16 Ill. Reg. 9115, effective June 2, 1992)

Section 401.150 Reciprocity

The Department shall accredit an out-of-state applicant provided that:

- a) The applicant holds a current credential as a Medical Radiographer, Nuclear Medicine Technologist, Radiation Therapy Technologist or Chiropractic Radiographic Assistant issued by another state or jurisdiction; and
- b) The standards and procedures for credentialing in the state or jurisdiction which issued the credential afford the same or comparable credentialing standards as those afforded by the Illinois statute and regulations; and
- c) The applicant presents the credential to the Department; and
- d) The applicant submits the appropriate application fee in accordance with Section 401.130.

(Source: Amended at 16 Ill. Reg. 9115, effective June 2, 1992)

Section 401.160 Additional Requirements for Radiographers Performing Mammography

- a) After September 18, 1992, in addition to meeting the accreditation requirements set forth in this Part, any medical radiographer who performs mammography shall have completed the required minimum initial training in mammography as identified in 401.Appendix C prior to performing mammography.
- b) A medical radiographer who performs mammography procedures shall engage in continuing education directly related to mammography at the rate of 8 contact hours

within each 24 month period after meeting the initial mammography training requirement. Subjects identified in 401.Appendix C shall be considered directly related to mammography and may be utilized toward meeting the continuing education requirements of Section 401.140(b).

- c) Programs, courses or other activities intended to meet the requirement for initial mammography training, or continuing education in mammography, shall be approved by the Department.
- d) Completion of initial mammography training, and continuing education in mammography, shall be verified to the Department.

AGENCY NOTE: For additional requirements for facilities who perform mammographic procedures see 32 Ill. Adm. Code 360.71.

(Source: Section repealed at 9 Ill. Reg. 2499, effective February 13, 1985; new section adopted at 16 Ill. Reg. 9115, effective June 2, 1992)

Section 401.170 Civil Penalties

- a) The Department shall assess civil penalties, in accordance with subsections (c) and (d), against any person who performs, and against the operator of the radiation installation where a person performs, medical radiation procedures without valid accreditation, unless the person performing the medical radiation procedures is specifically exempt from the accreditation requirements as specified in Section 401.30.
- b) Prior to assessing civil penalties, the Department shall confirm the violation of the accreditation requirements by:
 - 1) Observation of the violation by a Departmental Inspector or nondepartmental inspector;
 - 2) Obtaining records, documents, or other physical evidence;
 - 3) Obtaining statements from either the employer, or the employee which confirm the existence of the violation; or
 - 4) Obtaining statements from third parties, e.g., patients or co-workers, that corroborate the allegation that a violation has occurred.
- c) Civil Penalties shall be assessed against persons who perform medical radiation procedures without accreditation (i.e., unaccredited technologists) as follows:
 - 1) First violation by an unaccredited technologist - \$250.
 - 2) Second violation by an unaccredited technologist - \$500.
 - 3) Third and subsequent violations by an unaccredited technologist - \$1,000.
- d) Civil Penalties shall be assessed against the operators of a radiation installation where a person performs medical radiation procedures without valid accreditation as follows:
 - 1) First violation by an operator - \$500.
 - 2) Second and subsequent violations by an operator, within a 12 month period - \$1,000.
- e) The Department shall impose civil penalties by issuing a Preliminary Order and Notice of Opportunity for Hearing as provided in 32 Ill. Adm. Code 200.60. Each day the violation continues shall constitute a separate offense.
- f) Failure of an operator of a radiation installation to abate an accreditation violation or to pay a properly assessed civil penalty, shall cause the Department to issue an order prohibiting the use of any source of radiation at the installation until such time as the violation has been abated and all assessed civil penalties have been paid.

(Source: Amended at 13 Ill. Reg. 15005, effective September 11, 1989)

**Section 401.APPENDIX A Limited Diagnostic Radiography
Procedures by Type of Limited Accreditation**

- a) Limited Diagnostic Radiography - Chest
 - Chest: Routine P.A. and Lateral
 - Chest: Lateral Decubitus, Apical Lordotic, Obliques
- b) Limited Diagnostic Radiography - Extremities
 - Fingers
 - Hand
 - Wrist
 - Forearm
 - Elbow
 - Humerus
 - Shoulder
 - Clavicle
 - Scapula
 - Toes
 - Foot
 - Ankle
 - Lower leg
 - Knee
 - Patella
 - Femur
 - Hip
- c) Limited Diagnostic Radiography - Spine
 - Cervical Spine
 - Thoracic Spine
 - Lumbar Spine
 - Lumbosacral Spine
 - Sacroiliac Joints
 - Sacrum
 - Coccyx
- d) Limited Diagnostic Radiography - Skull and Sinuses
 - Skull
 - Paranasal Sinuses
 - Mandible
 - Facial bones

(Source: Added at 15 Ill. Reg. 7054, effective April 29, 1991)

**Section 401.APPENDIX B Example Topics Directly Related to
Radiologic Sciences**

As referenced in Section 401.140(b)(5), applicants may refer to this Appendix for subjects relating directly to radiologic sciences in completing the minimum requirements for continuing education.

(Source: Amended at 16 Ill. Reg. 9115, effective June 2, 1992)

**Section 401.APPENDIX C Minimum Training Requirements for
Radiographers Performing Mammography**

As referenced in Section 401.160, applicants may refer to this Appendix for subjects relating directly to mammography in completing the minimum requirements for continuing education.

(Source: Added at 16 Ill. Reg. 9115, effective June 2, 1992)

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

PART 405
CERTIFICATION OF INDIVIDUALS TO
PERFORM INDUSTRIAL RADIOGRAPHY

Section

405.10	Purpose and Scope
405.20	Definitions
405.30	Application for Certification
405.40	Categories of Certification
405.50	Examination Requirements
405.60	Examinations
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405.100	Duration of Certification
405.110	Fees
405.120	Reciprocity
405.130	Requirements for Renewal of Certification
405.140	Suspension and Revocation of Certification
405.150	Civil Penalties
APPENDIX A	Minimum Training Requirements for Industrial Radiography Applicable to Radioactive Materials and Radiation Machines

AUTHORITY: Implementing and authorized by Section 7a of the Radiation Protection Act of 1990 (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 210-7a) 420 ILCS 40/7a .

SOURCE: Adopted at 18 Ill. Reg. 10721, effective June 23, 1994.

Section 405.10 Purpose and Scope

- a) This Part establishes a program to certify persons to perform industrial radiography. Specifically, this Part provides:
 - 1) Minimum standards for training and experience for persons who perform industrial radiography;
 - 2) Application and examination requirements for certification and recertification;
 - 3) Standards for the recognition of certification by other parties;
 - 4) Provisions for the suspension or revocation of certification; and
 - 5) Civil penalties.
- b) This Part applies to any person who performs industrial radiography in this State. For purposes of this Part, industrial radiography does not include radiography performed with Lixiscopes or cabinet x-ray systems, nor does it include computed tomography or computer-based digital radiography in which the useful beam of radiation is collimated to detectors.

Section 405.20 Definitions

As used in this Part, the following definitions shall apply:

"Act" means the Radiation Protection Act of 1990 (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 210-1 et seq.) 420 ILCS 40 .

"Approved Training Program" means a program that the Department has determined is adequate to prepare

individuals to meet the training requirements prescribed in Section 405.Appendix A.

"Cabinet x-ray system" means an x-ray system with the x-ray tube installed in an enclosure which, independent of existing architectural structures except the floor on which it may be placed, is intended to contain at least that portion of a material being irradiated, provide radiation attenuation and exclude personnel from its interior during generation of x radiation. Included are all x-ray systems designed primarily for the inspection of carry-on baggage at airline, railroad, bus terminals and similar facilities. An x-ray tube used within a shielded part of a building or x-ray equipment that may temporarily or occasionally incorporate portable shielding is not considered a cabinet x-ray system.

"Certification" means the authorization by the Illinois Department of Nuclear Safety of an individual to perform industrial radiography in Illinois.

"Certified Industrial Radiographer" means an individual who has met prescribed training and experience requirements and has passed an approved examination and is authorized by the Department, pursuant to Section 405.90(a), to perform industrial radiography.

"Certified Industrial Radiographer Trainee" means an individual who is authorized by the Department, pursuant to Section 405.90(b), to be instructed in industrial radiography and who may perform industrial radiography while under the personal supervision of a Certified Industrial Radiographer or an approved Provisionally Certified Industrial Radiographer.

AGENCY NOTE: Instruction in industrial radiography for trainees certified by the Department includes on-the-job and field experience.

"Department" means the Illinois Department of Nuclear Safety.

"Director" means the Director of the Illinois Department of Nuclear Safety.

"Industrial Radiography" means the process used to perform the examination of the macroscopic structure of materials by non-destructive methods using radioactive materials or radiation machines. For purposes of this Part, industrial radiography does not include radiography performed with Lixiscopes or cabinet x-ray systems, nor does it include computed tomography or computer-based digital radiography in which the useful beam of radiation is collimated to detectors.

"Industrial Radiography - Radiation Machines" means the process of performing industrial radiography using radiation producing machines.

"Industrial Radiography - Radioactive Materials" means the process of performing industrial radiography using radioactive materials.

"Lixiscope" means a portable light-intensified imaging device using a sealed source.

"Personal supervision" means supervision provided by a Certified Industrial Radiographer or an approved Provisionally Certified Industrial Radiographer who is physically present at the immediate site where sources of

radiation and associated equipment are being used, visually evaluating the performance of the Certified Industrial Radiographer Trainee and in such proximity that immediate assistance can be given if required.

"Provisionally Certified Industrial Radiographer" means an individual who was employed as an industrial radiographer prior to September 1, 1994, and who is authorized by the Department, pursuant to Section 405.90(c), to perform industrial radiography.

"Radiographic exposure device" means any instrument containing a sealed source fastened or contained therein, in which the sealed source or shielding thereof may be moved, or otherwise changed, from a shielded to unshielded position for purposes of making a radiographic exposure.

Section 405.30 Application for Certification

- a) Any individual applying to the Department for certification to perform industrial radiography shall:
 - 1) Submit a complete and legible application on a form prescribed by the Department;
 - 2) Pay the appropriate non-refundable application fee in accordance with Section 405.110;
 - 3) Meet the examination requirements set forth in Section 405.50 or satisfy the requirements for certification based on reciprocity as set forth in Section 405.120; and
 - 4) Provide evidence that the requirements for the given category and class for which certification is sought have been met.
- b) Any individual who seeks Provisional Certification as an industrial radiographer shall submit an application to the Department no later than September 1, 1994.
- c) The appropriate fee shall accompany the application when filing with the Department. An application shall be deemed filed on the date that it is received by the Department or on the date that it is postmarked by the United States Postal Service.

Section 405.40 Categories of Certification

- a) The Department shall certify individuals to perform industrial radiography in one or more of the following categories:
 - 1) Certified Industrial Radiographer;
 - 2) Provisionally Certified Industrial Radiographer; or
 - 3) Certified Industrial Radiographer Trainee.
- b) Each certification issued shall include a class endorsement for the type of industrial radiography authorized. Such class endorsements are limited to:
 - 1) Radioactive Materials;
 - 2) Radiation Machines; or
 - 3) Radioactive Materials and Radiation Machines.

Section 405.50 Examination Requirements

- a) An individual who seeks certification as a Certified Industrial Radiographer must have passed, prior to application for certification, a written examination appropriate to the category and class of certification sought in accordance with Section 405.60. An individual seeking certification as a Certified Industrial Radiographer after September 1, 1995, must pass, within 12 months prior to application for certification, a written examination appropriate to the category and class of certification sought in accordance with Section 405.80. In the event

that this examination is not passed, the individual seeking certification as a Certified Industrial Radiographer may apply, during this 12 month period, for re-examination in accordance with subsection (d) below.

- b) An individual who holds certification as a Certified Industrial Radiographer Trainee shall take the examination for Certified Industrial Radiographer as prescribed by Section 405.60 within 12 months after certification. In the event that this examination is not passed, the Certified Industrial Radiographer Trainee may apply for re-examination in accordance with subsection (d) below.
 - c) An individual who is a Provisionally Certified Industrial Radiographer shall take the examination for Certified Industrial Radiographer as prescribed by Section 405.60 on or before September 1, 1995. In the event that this examination is not passed, the Provisionally Certified Industrial Radiographer may apply for re-examination in accordance with subsection (d) below.
- AGENCY NOTE: In the event the provisionally certified industrial radiographer does not comply with application or testing requirements of subsection (c) above, certification as Provisionally Certified Industrial Radiographer shall expire on September 1, 1995.
- d) Application for examination or re-examination shall be on forms prescribed by the Department and shall include the appropriate fee specified by Section 405.110. Examination fees shall be non-refundable.
 - e) Examinees shall present photographic identification (e.g., drivers license) at the time of examination.

Section 405.60 Examinations

- a) The Department shall administer examinations in each class of industrial radiography as specified in Section 405.40(b) at such times and places as the Department determines necessary.
 - 1) The examination shall be available through the Conference of Radiation Control Program Directors, Inc.
 - 2) The scaled passing score shall be 70 percent.
 - 3) A candidate who fails an examination may apply for re-examination in accordance with Section 405.50.
- b) The Department shall accept alternative examinations provided that such examinations are found acceptable by the U.S. Nuclear Regulatory Commission.

Section 405.70 Approved Training Program

Industrial radiographer training programs shall be approved by the Department. The Department shall recognize other programs approved by another state or jurisdiction provided that such programs consist of standards and procedures that are the same or comparable to the standards and procedures established by the Radiation Protection Act of 1990 and this Part. The Department shall base its approval on information provided by the training program that shall include:

- a) Curriculum information sufficient to assure inclusion of subjects referenced in Section 405. Appendix A;
- b) Copies of test questions and answers and other evaluation tools and criteria used to demonstrate a participant's comprehension of subject matter in Section 405. Appendix A; and
- c) Resumes of instructors.

Section 405.80 Experience Requirements for Certification

Applicants for certification to perform industrial radiography shall have a minimum of experience appropriate to each category and class of industrial radiography as follows:

- a) Certified Industrial Radiographer
 - 1) Radioactive Materials 200 hrs
 - 2) Radiation Machines 120 hrs
 - 3) Both Radioactive Materials and Radiation 320 hrs

Machines of which not less than 200 hours shall be with radioactive materials and not less than 120 hours shall be with radiation machines.
- b) Provisionally Certified Industrial Radiographer
 - 1) Employment as an industrial radiographer prior to September 1, 1994; and
 - 2) Compliance with the requirements of 32 Ill. Adm. Code 350.2010(a).
- c) Certified Industrial Radiographer Trainee. No prior experience required.

Section 405.90 Requirements for Issuance of Certification

The Department shall certify in a category and class of industrial radiography any individual who has satisfied the following requirements:

- a) Certified Industrial Radiographer
 - 1) Submitted an application for certification on a form prescribed by the Department;
 - 2) Submitted the application fee specified in Section 405.110(a);
 - 3) Passed an examination as required by Section 405.50(a) or satisfies the requirements for certification based on reciprocity as set forth in Section 405.120; and
 - 4) Completed the required hours of experience in industrial radiography as specified in Section 405.80 or satisfies the requirements for certification based on reciprocity as set forth in Section 405.120.
- b) Certified Industrial Radiographer Trainee
 - 1) Submitted an application for certification on a form prescribed by the Department;
 - 2) Submitted the application fee specified in Section 405.110(a); and
 - 3) Submitted documentation of successful completion of an approved training program as specified in Section 405.70 or satisfies the requirements for certification based on reciprocity as set forth in Section 405.120.

AGENCY NOTE: Training includes didactic study incorporating those topics included in Section 405. Appendix A. Training does not include on-the-job experience.
- c) Provisionally Certified Industrial Radiographer
 - 1) No later than September 1, 1994, submitted an application for certification on a form prescribed by the Department;
 - 2) Submitted the application fee specified in Section 405.110(a); and
 - 3) Submitted documentation that prior to September 1, 1994, the individual was employed as an industrial radiographer and has complied with the requirements of 32 Ill. Adm. Code 350.2010(a).

AGENCY NOTE: Examples of acceptable documentation are a written statement from an employer that the applicant is or has been employed as an industrial radiographer or a copy of a radioactive materials license, issued by the Department or by the regulatory agency having jurisdiction in another state, identifying the applicant as an authorized user of industrial radiography sources.

Section 405.100 Duration of Certification

- a) The duration of certification issued by the Department shall be:
 - 1) Certified Industrial Radiographer 5 years
 - 2) Certified Industrial Radiographer Trainee 2 years
 - 3) Provisionally Certified Industrial Radiographer

Certification as a Provisionally Certified Industrial Radiographer, issued pursuant to Section 405.90(c) shall expire on September 1, 1996, provided that the application and testing requirements of Section 405.50(c) have been met. In the event the provisionally certified industrial radiographer does not comply with application or testing requirements of Section 405.50(c), certification as a Provisionally Certified Industrial Radiographer shall expire on September 1, 1995.
- b) Certification for Provisionally Certified Industrial Radiographer and Certified Industrial Radiographer Trainee are nonrenewable.

Section 405.110 Fees

- a) The application fees for examination or certification shall be non-refundable and shall be as follows:
 - 1) Each application for examination by the Department/. \$75.00
 - 2) Each application for certification:
 - A) Certified Industrial Radiographer/. \$50.00
 - B) Certified Industrial Radiographer Trainee/. \$50.00
 - C) Provisionally Certified Industrial Radiographer/. \$50.00
- b) The appropriate fees shall accompany the application when filing with the Department.

Section 405.120 Reciprocity

- a) The Department shall issue certification to an applicant who has been certified in another state or jurisdiction provided that:
 - 1) The applicant holds a valid certification in the appropriate category and class issued by another state or jurisdiction;
 - 2) The standards and procedures for certification in the state or jurisdiction that issued the certification are the same or comparable to the certification standards established by the Radiation Protection Act of 1990 and this Part;
 - 3) The applicant presents a copy of the certification document issued by the other state or jurisdiction to the Department; and
 - 4) The applicant submits the application fee in accordance with Section 405.110(a).
- b) Individuals who are certified by reciprocity shall either:
 - 1) Maintain the certification upon which the reciprocal certification was issued; or
 - 2) Satisfy the requirements of Section 405.90 prior to the expiration of the certification upon which reciprocal certification was issued.

Section 405.130 Requirements for Renewal of Certification

- a) Prerequisites
 - 1) An individual shall submit an application for re-examination and renewal of certification at least six months prior to the expiration date of certification. The Department shall waive this requirement if the applicant satisfies the requirements of Section

405.30(a). An individual may not legally perform industrial radiography without valid certification.

- 2) Each applicant shall submit a complete and legible application with the fee for re-examination and renewal of certification in accordance with Section 405.30(a).
- b) Re-examination. Applicants for renewal of certification shall meet the requirements of Section 405.90(a) including re-examination as described in subsection (a) above.
- c) Certification as a Provisionally Certified Industrial Radiographer is nonrenewable.
- d) Certification as a Certified Industrial Radiography Trainee is nonrenewable.

Section 405.140 Suspension and Revocation of Certification

- a) The Department shall act to suspend or revoke an individual's certification for any one or a combination of the following causes:
 - 1) Knowingly causing a material misstatement or misrepresentation to be made in the application for initial certification or renewal of certification if such misstatement or misrepresentation would impair the Department's ability to assess and evaluate the applicant's qualifications for certification pursuant to this Part;
 - 2) Knowingly falsifying records of employees when such falsification would impair the Department's ability to assess and evaluate the applicant's qualifications for certification pursuant to this Part;
 - 3) Willfully evading the statute or regulations pertaining to certification, or willfully aiding another person in evading such statute or regulations pertaining to certification;
 - 4) Having been convicted of a crime which is a felony under the laws of this State or conviction of a felony in a federal court, unless such individual demonstrates to the Department that he/she has been sufficiently rehabilitated, by restoration of all civil rights, to warrant the public trust;
 - 5) Exhibiting significant or repeated incompetence in the performance of industrial radiography duties;
 - 6) Having a physical or mental illness or disability that results in the individual's inability to perform industrial radiography duties with reasonable judgment, skill and safety;
 - 7) Performing industrial radiography in such a manner that requirements of 32 Ill. Adm. Code 350 are violated resulting in a threat to health and safety of the individual, other workers or the public;
 - 8) Repeatedly using alcohol, narcotics or stimulants to such an extent as to impair the performance of duties;
 - 9) Having had a similar certification suspended or revoked if the grounds for that suspension or revocation are the same or equivalent to one or more grounds for suspension or revocation as set forth herein; and
 - 10) Failure to maintain the out-of-state certification upon which certification by reciprocity was issued.
- b) If, based upon any of the above grounds, the Department determines that action to suspend or revoke certification is warranted, the Department shall notify the individual and shall provide an opportunity for a hearing in accordance with 32 Ill. Adm. Code 200.60. An opportunity for a hearing shall be provided before the Department takes action to suspend or revoke an individual's certification unless the Department finds that an *immediate suspension of certification is required to protect against immediate*

danger to the public health or safety (Section 38 of the Act), in which case the Department shall suspend an individual's certification pending a hearing.

- c) If the Department finds that removal of certification is warranted, the usual action shall be a suspension of certification for up to one year. The term of suspension may be reduced by the Director, upon the recommendation of the hearing officer, if the hearing officer finds, based upon evidence presented to him/her during a hearing, that the conditions leading to the Preliminary Order for Suspension can be cured in less than one year. However, if the Department finds that the causes are of a serious or continuous nature, such as past actions which posed an immediate threat to occupational or public health or safety or deficiencies that cannot be cured within one year, the Department shall revoke the individual's certification.
- d) When an individual's certification is suspended or revoked, the individual shall surrender his/her certification document to the Department until the termination of the suspension period or until reissuance of the certification.
- e) An individual whose certification has been revoked may seek reinstatement of certification by filing with the Department a petition for reinstatement which complies with the requirements of 32 Ill. Adm. Code 200.40. Such petition may be filed one year or more after the beginning of the revocation period. The individual shall be afforded a hearing in accordance with 32 Ill. Adm. Code 200 and shall bear the burden of proof of establishing that the certification should be reinstated due to rehabilitation or other just cause.

Section 405.150 Civil Penalties

- a) The Department shall assess civil penalties, in accordance with subsection (c) below, against any individual who performs industrial radiography without valid certification. AGENCY NOTE: Licensees and registrants that allow individuals who are not certified to perform industrial radiography are also subject to civil penalties. These penalties are assessed pursuant to 32 Ill. Adm. Code 310.
- b) Prior to assessing civil penalties, the Department shall confirm the violation of the certification requirements by:
 - 1) Observation of the violation by a Department inspector;
 - 2) Obtaining records, documents or other physical evidence;
 - 3) Obtaining statements from either the employer or the employee which confirm the existence of the violation; or
 - 4) Obtaining statements from third parties (e.g., Nondepartment Inspectors or co-workers) that corroborate the allegation that a violation has occurred.
- c) Civil penalties shall be assessed against individuals who perform industrial radiography without certification (i.e., uncertified radiographer) as follows:
 - 1) First violation by an uncertified individual - \$250.
 - 2) Second violation by an uncertified individual - \$500.
 - 3) Third and subsequent violation by an uncertified individual - \$1,000 for each violation.
- d) The Department shall impose civil penalties by issuing a Preliminary Order and Notice of Opportunity for Hearing as provided in 32 Ill. Adm. Code 200.60. Each day the violation continues shall constitute a separate offense.

**Section 405.APPENDIX A Minimum Training Requirements for
Industrial Radiography Applicable to Radioactive Materials and
Radiation Machines**

- a) Fundamentals of Radiation Safety
 - 1) Characteristics of radiation
 - 2) Units of radiation dose and quantity of radioactivity
 - 3) Significance of radiation dose
 - A) Radiation protection standards
 - B) Biological effects of radiation
 - 4) Levels of radiation from sources of radiation
 - 5) Methods of controlling radiation dose
 - A) Working time
 - B) Working distances
 - C) Shielding
- b) Radiation Detection Instrumentation to be Used
 - 1) Use of radiation survey instruments
 - A) Operation
 - B) Calibration
 - C) Limitations
 - 2) Survey techniques
 - 3) Use of personnel monitoring equipment
 - A) Film badges
 - B) Thermoluminescent dosimeters
 - C) Pocket dosimeters
- c) The Requirements of Pertinent Federal and State Regulations
- d) Written Operating and Emergency Procedures
- e) Case Histories of Radiation Accidents
- f) Radiography Equipment to be Used
 - 1) For Industrial Radiography Using Radioactive Material
 - A) Remote handling equipment
 - B) Radiographic exposure devices and sealed sources
 - C) Storage containers
 - D) Operation and control of radiography equipment
 - E) Demonstration of competency to safely perform radiographic procedures using a simulated source of radioactive material
 - 2) For Industrial Radiography Using Radiation Machines
 - A) Remote exposure equipment
 - B) Radiation machine exposure equipment
 - C) Operation and control of radiography equipment
 - D) Demonstration of competency to safely perform radiographic procedures using a simulated source of radiation

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

PART 410
RADIATION INSPECTORS AND INSPECTIONS

Section

- 410.10 Policy and Scope
- 410.20 Radiation Inspectors Education/Experience and Instrumentation Requirements
- 410.30 Approval of Application and Application/Registration Fees
- 410.35 Suspension and Revocation of Registration as a Nondepartment Qualified Inspector
- 410.40 Radiation Installations and Classifications
- 410.50 Inspection Procedures
- 410.60 Choice of Type of Inspector, Inspection Fees and Inspection Schedule
- 410.70 Separate Installation
- 410.80 Change in Operator
- ILLUSTRATION A New Facility Filing Anniversary Date (Class C Facility Used As An Example) (Repealed)
- ILLUSTRATION B Existing Facility Filing Anniversary Date (Class B Facility Used As An Example) (Repealed)

AUTHORITY: Implementing and authorized by Sections 5 and 25 of the Radiation Protection Act of 1990 420 ILCS 40/5 and 25 .

SOURCE: Adopted at 8 Ill. Reg. 23209, effective November 19, 1984; amended at 9 Ill. Reg. 17821, effective November 5, 1985; amended at 10 Ill. Reg. 13265, effective July 29, 1986; amended at 13 Ill. Reg. 342, effective January 30, 1989; amended at 14 Ill. Reg. 13638, effective August 13, 1990; amended at 17 Ill. Reg. 17953, effective October 4, 1993; amended at 20 Ill. Reg. 9570, effective July 5, 1996.

Section 410.10 Policy and Scope

- a) This Part implements the provisions of the Radiation Protection Act of 1990 (the Act) 420 ILCS 40 regarding the inspection of radiation machines by nondepartment qualified inspectors. Specifically this Part:
 - 1) Establishes procedures for inspections of radiation machines;
 - 2) Establishes the standards and procedures that the Department will apply for approving individuals as nondepartment qualified inspectors of radiation machines;
 - 3) Establishes standards and procedures to be applied by the Department when withdrawing its approval of a nondepartment qualified inspector; and
 - 4) Establishes the Department's procedures for reviewing the inspection procedures followed

by nondepartment qualified inspectors and the inspection reports prepared by nondepartment qualified inspectors.

- b) This Part shall apply to any person who operates a radiation installation in Illinois. This Part shall also apply to any person, other than a Departmental inspector, who performs inspections or tests of radiation machines required by Section 25 of the Radiation Protection Act of 1990.

(Source: Amended at 20 Ill. Reg. 9570, effective July 5, 1996)

Section 410.20 Radiation Inspectors Education/Experience and Instrumentation Requirements

- a) Inspections and testing of radiation machines shall be conducted by designated Department personnel or by nondepartment qualified inspectors that are approved by the Department in accordance with Section 410.30 of this Part.
- b) In addition to satisfying the other requirements for approval set forth in this Part, an individual seeking approval as a nondepartment qualified inspector shall meet the education/certification and experience in clinical practice requirements indicated in any one of the criteria set forth in this subsection (b).

Education and/or Certification		Experience
1) Certification by the American Board of Radiology, American Board of Medical Physics or Canadian College of Medical Physics, in radiological physics or diagnostic radiological physics	and	experience included in certification.
2) Certification by the American Board of Health Physics	and	6 months of x-ray survey experience.
3) Doctorate (Ph.D.) or Master's (MS/MA) degree in health physics, medical radiological physics or physics	and	1 year of applied x-ray radiation protection experience of which 6 months must be x-ray experience.
4) Bachelor's (BS/BA) degree in health physics, and medical radiological physics or physics	and	2 years of applied x-ray radiation protection experience of which 6 months must be x-ray survey experience.
5) Master's (MS/MA) or Bachelor's (BS/BA) degree in a physical or life science or in mathematics	and	3 years of applied x-ray radiation protection experience of which 1 year must be x-ray survey experience.

- c) Upon initial application to the Department, and as a condition for approval as a qualified inspector, an applicant shall submit verification of access to instruments which will enable the individual to perform inspections and tests in accordance with Department standards.
- d) Individuals approved by the Department as nondepartment qualified inspectors will continue to remain approved as nondepartment qualified inspectors unless approval is removed for cause pursuant to Section 410.35 of this Part.

(Source: Amended at 20 Ill. Reg. 9570, effective July 5, 1996)

Section 410.30 Approval of Application and Application/Registration Fees

- a) An applicant for approval by the Department as a nondepartment qualified inspector shall submit a complete and legible application on a form prescribed and furnished by the Department. *The Department shall assess each applicant an application fee of \$50 which will serve as a registration fee for the remainder of the calendar year. The application fee is non-refundable.* (Section 25(e) of the Act)
- b) The Department shall provide written notification to the applicant concerning the status of the application within 4 weeks after receipt of the application. If approval is granted, the applicant shall receive a "Notice of Approval" and the individual's name and address shall be entered in the record of persons approved as nondepartment qualified inspectors of radiation machines.
- c) *The Department shall assess all nondepartment qualified inspectors an annual registration fee of \$50 payable on January 1 of each year. The registration fee is non-refundable.* (Section 25(e) of the Act) Failure of the inspector to remit the appropriate registration fee by January 1, will cause the Department to remove the individual's name from the record specified in subsection (b) of this Section. If an individual's name is removed from the record of nondepartment qualified inspectors, the Department will not accept radiation machine inspection reports completed on or after the date the inspector's name was removed from the record. Radiation machine inspection reports prepared and submitted after an individual has been reinstated to the record will be accepted by the Department.
- d) If an individual's name has been removed from the record of nondepartment qualified inspectors due to nonpayment of the fee prescribed in Section 25(e) of the Act, that individual's name shall be reinstated automatically to the record of nondepartment qualified inspectors upon payment of and receipt by the Department of the prescribed fee.

(Source: Amended at 20 Ill. Reg. 9570, effective July 5, 1996)

Section 410.35 Suspension and Revocation of Registration as a Nondepartment Qualified Inspector

- a) The Department shall suspend the registration of an individual as a nondepartment qualified inspector and remove the individual's name from the record of nondepartment qualified inspectors for any one or a combination of the following causes:
 - 1) Knowingly causing a material misstatement or misrepresentation to be made in the application for approval as a nondepartment qualified inspector if such misstatement or misrepresentation would impair the Department's ability to assess and evaluate the applicant's qualifications for approval under this Part;
 - 2) Willfully evading the Department's regulations, or willfully aiding another person in evading such regulations;
 - 3) Exhibiting significant or repeated incompetence in the performance of inspections of radiation machines;
 - 4) Knowingly submitting to the Department an inspection report that contains false or misleading information; or
 - 5) Submitting to the Department under his/her inspector identification number and signature a report for an inspection that he or she did not personally perform.
- b) The Department shall revoke the registration of an individual as a nondepartment qualified inspector for repetitive activities initially resulting in suspension.
- c) If, based upon any of the above grounds, the Department determines that action is necessary to suspend or revoke the registration of a nondepartment qualified inspector and to remove the individual's name from the record of nondepartment qualified inspectors, the Department shall first notify the individual of the reason for its action and the proposed length of a suspension and shall provide an opportunity for a hearing in accordance with 32 Ill. Adm. Code 200.60. An opportunity for a hearing shall be provided before the Department takes action to suspend or revoke an individual's registration.
- d) An individual whose registration has been revoked from the record of nondepartment qualified inspectors may seek reinstatement to the record by filing a petition for reinstatement with the Department. Such petition may only be accepted for consideration by the Department 1 year or more after the individual's name has been removed from the record of nondepartment qualified inspectors. The individual shall be afforded a hearing in accordance with 32 Ill. Adm. Code 200.

(Source: Amended at 20 Ill. Reg. 9570, effective July 5, 1996)

Section 410.40 Radiation Installations and Classifications

Radiation installations shall be classified based on the type of radiation machines located within the installation as follows:

- a) *Class A - shall include all radiation machines located in dental offices and clinics and used solely for dental diagnosis or located in veterinary offices and used solely for diagnosis and all installations using commercially manufactured cabinet radiographic/fluoroscopic radiation machines and electron microscopes. (See Section 25(f) of the Act.)*
- b) *Class B - shall include all radiation machines, other than machines used for performing mammography, located in offices or clinics of persons licensed under the Medical Practice Act of 1987 (Ill. Rev. Stat. 1991, ch. 111, par. 4400-1 et seq.) 225 ILCS 60 ;, or under the Podiatric Medical Practice Act of 1987 (Ill. Rev. Stat. 1991, ch. 111, par. 4801 et seq.) 225 ILCS 100 and used solely for diagnosis or therapy and all installations using spectroscopy radiation machines, noncommercially manufactured cabinet radiographic/fluoroscopic radiation machines, portable radiographic/fluoroscopic units, non-cabinet baggage/package fluoroscopic radiation machines and electronic beam welders. See Section 25(f) of the Act.)*
- c) *Class C - shall include all radiation machines which are not classified as Class A or Class B. Class C shall include but not be limited to radiation machines located in hospitals and educational institutions, all radiation machines used for performing mammography procedures and all installations using diffraction radiation machines, open radiography radiation machines, closed radiographic/fluoroscopic radiation machines and radiation machines used as gauges. Test booths, tubs, baths or rooms used by manufacturing, assembly or repair facilities for testing radiation machines shall be categorized as Class C radiation installations. (See Section 25(f) of the Act.)*
- d) Radiation installations utilizing radiation machines that are in different classes (see subsections (a), (b) and (c) above) will be assigned a classification based upon the machine(s) requiring the most frequent inspecting and testing. (See Section 410.60(d).)

(Source: Amended at 17 Ill. Reg. 17953, effective October 4, 1993)

Section 410.50 Inspection Procedures

- a) The nondepartment qualified inspector shall:
 - 1) Establish whether radiation machines are being maintained and operated in accordance with standards established by the Department to protect the public health as set forth in 32 Ill. Adm. Code 310, 320, 340, 350, 360, 380, 390, 400 and 401; and

- 2) Consult with the operator to ascertain the identity of individuals who use the equipment to administer ionizing radiation to human beings (see 32 Ill. Adm Code 360.30(a)(4) and 360.30(i)) and to verify that those named individuals are licensed in accordance with State law, are accredited by the Department or are exempt from such requirements in accordance with 32 Ill. Adm. Code 401.30.
- b) The nondepartment qualified inspector shall provide timely, accurate and thorough inspection reports and certify all survey findings on appropriate Department radiation machine inspection forms. A survey instruction manual will be provided to each inspector by the Department for the completion of this requirement.
- c) The nondepartment qualified inspector shall perform radiation measurements with instruments which are sufficiently sensitive to determine compliance with the standards established by the Department under this section. These instruments shall be calibrated with devices which have no more than a three-step (tertiary) calibration, traceable to the National Institute of Standards and Technology.
- d) The nondepartment qualified inspector shall certify on each radiation inspection report that he prepares for submission to the Department that he personally performed the inspection and that the inspection was performed in accordance with the standards established by the Department. (Section 25(b) of the Act)
- e) The nondepartment qualified inspector shall certify on appropriate Department radiation machine inspection forms for each inspection that his/her instruments have been properly calibrated at intervals not to exceed 12 months prior to each inspection.
- f) The nondepartment qualified inspector shall maintain, for a period of at least one inspection cycle (see Section 410.60(d) of this Part), a copy of all inspection data gathered during inspections of radiation machines conducted in accordance with subsection (a) of this Section.
- g) Each operator of a radiation installation shall, within 30 days of completion of the inspection and testing of each radiation machine by a nondepartment qualified inspector, forward a clear, legible copy of the inspection report along with the appropriate inspection review fee to the Department. (See Section 410.60(a)(3) of this Part.)
- h) In the event the Department has reason to question the accuracy or thoroughness of a radiation machine inspection report due to the submission of incomplete or contradictory information or, if the Department is not able to verify compliance with the Department's standards for operating such equipment in accordance with 32 Ill. Adm. Code 310, 320, 340, 350, 360, 380, 390, 400 and 401, the report will be returned to the operator for completion, correction or for reinspection as appropriate. Forms returned to the operator for

corrections or completion, or for reinspection must be returned to the Department within 30 days of receipt.

- i) Within 30 days of receipt of a completed radiation machine inspection report, the Department will provide results to the operator regarding the inspector's survey.
- j) Reviews of nondepartment qualified inspectors' survey findings and inspection procedures will be conducted by the Department. Items and procedures considered as part of such reviews shall include, but need not be limited to, one or more of the following:
 - 1) The type of instruments used by the inspector;
 - 2) The procedures for the use of these instruments to determine compliance with Department standards;
 - 3) The thoroughness and accuracy of inspection reports;
 - 4) Use of other documents and investigative procedures to assure compliance with Department standards listed in subsection (a) of this Section;
 - 5) Reinspection and testing by the Department of the radiation machines, records, and associated operation procedures of a radiation installation that were inspected by a nondepartment qualified inspector; and
 - 6) Visual observation of the nondepartment qualified inspector during the performance of an inspection.

(Source: Amended at 20 Ill. Reg. 9570, effective July 5, 1996)

Section 410.60 Choice of Type of Inspector, Inspection Fees and Inspection Schedule

- a) Operators of radiation installations shall assure that the installations, including all radiation machines located therein, are registered with the Department in accordance with the provisions of 32 Ill. Adm. Code 320 and are inspected and tested in accordance with the requirements of this Part.
 - 1) Operators may elect to have their radiation machines and associated operating procedures inspected and tested by either a Departmental inspector or by a nondepartment qualified inspector whose name is included in the Department's record of persons approved as nondepartment qualified inspectors of radiation machines.
 - 2) *The fee for a Department inspection and testing will be \$55 per radiation machine located in dental offices and clinics and used solely for dental diagnosis, in veterinary offices and used solely for diagnosis, or in offices and clinics of persons licensed under the Podiatric Medical Practice Act of 1987 225 ILCS 100 and used solely for diagnosis*

or therapy. The fee for inspection and testing in all other cases shall be \$80 per radiation machine. (Section 25(a) of the Act)

- 3) If the operator elects to have a nondepartment qualified inspector inspect and test the radiation equipment, *the Department will assess an inspection review fee of \$25 per radiation machine. The inspection review fee shall not apply to inspections of radiation machines used for mammography. (Section 25(b) of the Act)*
- 4) The Department shall bill the operator for the appropriate fee as soon as practical after the machine has been inspected and tested.
 - A) *Fees assessed under this Section shall be due within 60 days of billing. (Section 25(a) of the Act)*
 - B) *If the fee is not paid within 60 days of the initial billing, the Department may order the operator of the installation to cease use of the machines for which the fee is outstanding or take other appropriate enforcement action as provided in Section 36 of the Act. (Section 25(a) of the Act)*
- b) Operators of radiation installations shall assure that all radiation machines located in that installation are maintained and operated in accordance with standards established by the Department to protect the public health and safety as set forth in 32 Ill. Adm. Code 310, 320, 340, 350, 360, 380, 390, 400 and 401. Operators shall also assure that all persons who use a radiation machine to administer ionizing radiation to human beings are licensed in accordance with the requirements of 32 Ill. Adm. Code 360.10, or are accredited by the Department, or exempt from such requirements in accordance with 32 Ill. Adm. Code 401.30.
- c) Inspection Report Filing Anniversary Date
 - 1) *Each operator of a radiation installation shall file an application for initial inspection and testing to be performed by either a Departmental inspector or a nondepartment qualified inspector no later than 30 days after the initial installation of a radiation machine(s). The radiation machine(s) shall be inspected and tested in accordance with Section 410.50(a) of this Part and radiation inspection report(s) filed with the Department within 6 months of the date of initial installation. (Section 25(c) of the Act) The inspection and testing end date will establish the operator's filing anniversary date for filing subsequent radiation machine inspection reports. All future inspection and testing of the operator's radiation machine(s) must be performed and the radiation inspection report filed either on the filing anniversary date or within the 5-month period immediately preceding the operator's filing anniversary date. Submission of inspection reports within*

the 5-month period immediately preceding the operator's filing anniversary date will not change the filing anniversary date for subsequent inspection reports.

- 2) If any radiation machine(s) is installed, relocated (i.e., stationary equipment that has been moved) or reactivated within 7 months prior to the operator's inspection report filing anniversary date and if the machine(s) is inspected during the 7-month period, the radiation machine(s) does not have to be reinspected within the 5-month period prescribed in subsection (c)(1) of this Section. The radiation inspection report(s) shall be filed with the Department on or before the operator's inspection report filing anniversary date.
- 3) If any radiation machine(s) totally replaces the operator's radiation machine inventory, the operator's inspection report filing anniversary date will be changed to the end date of the inspection and testing of the radiation machine(s). In accordance with subsection (c)(1) of this Section, inspection reports shall be filed within 6 months from the date of installation of the replacement machine(s).
- d) An operator shall file an application for subsequent inspections to be performed by either a Departmental or nondepartment qualified inspector in accordance with the following schedule:
 - 1) Operators of Class A installations shall file an application for inspection each 5 years.
 - 2) Operators of Class B installations shall file an application for inspection each 2 years.
 - 3) Operators of Class C installations shall file an application for inspection annually.
 - 4) Applications for inspections of existing radiation machines must be filed with the Department within 6 months of the operator's inspection report filing anniversary date.
- e) Operators of radiation installations shall notify the Department within 30 days of the installation of new, used, relocated, or reactivated radiation machines. Inspection and testing of the radiation machine(s) shall be performed in accordance with subsection (c) of this Section and radiation inspection report(s) filed with the Department within 6 months of the date of installation/activation of the system(s). The selection of Departmental or nondepartment qualified inspector which was made pursuant to subsection (d) of this Section, shall also apply to inspections of equipment required by this subsection (e), unless the Department is notified that a change is requested. This Section applies to the relocation or reactivation of a radiation machine(s) that previously had been stored or rendered mechanically or electrically inoperable by the operator.

(Source: Amended at 20 Ill. Reg. 9570, effective July 5, 1996)

Section 410.70 Separate Installation

Radiation installations shall be defined as any location or facility where radiation machines are used. For purposes of registration and inspection frequency, the Department shall interpret "radiation installation" as follows:

- a) A facility where one or more radiation machines which are utilized by a given Class as defined in Section 410.40, are operated by the same person and are located either in a single building or in a group of buildings which are contiguous to one another will be treated as a single radiation installation, except as provided in subsection (b) below.
- b) If the Department is treating radiation machines which are located in different buildings as being part of a single radiation installation in accordance with subsection (a) above and the operator seeks to have the facilities treated as separate installations, the Department will consider the facilities as separate radiation installations upon receipt of a written request of the operator.

(Source: Amended at 17 Ill. Reg. 17953, effective October 4, 1993)

Section 410.80 Change in Operator

Within 30 days of changing the operator of a radiation installation, the new operator must notify the Department and must file an application for inspection by either a Departmental inspector or by a nondepartment qualified inspector. Such filing and inspection must be made regardless of the length of time which has passed since the most recent inspection of the radiation installation through the previous operator.

(Source: Amended at 20 Ill. Reg. 9570, effective July 5, 1996)

Section 410.ILLUSTRATION A NEW FACILITY FILING ANNIVERSARY DATE (Class C Facility Used As An Example) (Repealed)

(Source: Repealed at 17 Ill. Reg. 17953 effective October 4, 1993)

Section 410.ILLUSTRATION B Existing Facility Filing Anniversary Date (Class B Facility Used As An Example) (Repealed)

(Source: Repealed at 17 Ill. Reg. 17953, effective October 4, 1993)

TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER b: RADIATION PROTECTION

PART 420
REGISTRATION OF RADON DETECTION AND
MITIGATION SERVICES

Section

420.10	Policy and Scope
420.20	Definitions
420.30	Exemptions
420.40	Application for Registration
420.50	Issuance of Registration Certificates
420.60	Fees
420.70	Suspension and Revocation of Registration
420.80	Civil Penalties

AUTHORITY: Implementing and authorized by "AN ACT in relation to radon testing" (Ill. Rev. Stat. 1989, ch. 111 1/2, par. 242-1 et seq.).

SOURCE: Adopted at 14 Ill. Reg. 19308, effective November 26, 1990.

Section 420.10 Policy and Scope

- a) This Part establishes standards and procedures for registration of persons who perform any service to detect the presence of radon or radon progeny. Nothing in the Act or this Part shall be construed to limit or affect in any respect the practice of persons properly licensed under other statutes or regulations with respect to their professions.
- b) This Part shall apply to any person who sells devices or who performs services for compensation to detect the presence of radon or radon progeny in the State, unless specifically exempt under "AN ACT in relation to radon testing" (Ill. Rev. Stat. 1989, ch. 111 1/2, par. 242-1 et seq.) or under Section 420.30.
- c) This Part shall apply to persons who supervise students or apprentices for purposes of instructing them how to perform radon detection services.

Section 420.20 Definitions

As used in this Part, the following definitions apply:

"Act" means "AN ACT in relation to radon testing" (Ill. Rev. Stat. 1989, ch. 111 1/2, par. 242-1 et seq.).

"Certificate of Registration" means the certificate issued by the Department as evidence that a person satisfies the requirements for registration or provisional registration.

"Department" means the Illinois Department of Nuclear Safety.

"Individual" means a natural person, i.e., a person that is not a governmental body, firm, association, partnership, copartnership, joint venture, company, corporation, joint stock company, trust, estate or other legal entity.

"Person" means any natural person or individual, governmental body, firm, association, partnership,

copartnership, joint venture, company, corporation, joint stock company, trust, estate or other legal entity.

"Radon" means any of the gaseous radioactive decay products of uranium or thorium.

"Radon progeny" means any combination of the radioactive decay products of radon.

"Registration" means the registration granted by the Department which authorizes a person to perform services to detect the presence of radon.

Section 420.30 Exemptions

- a) The Department shall, upon application therefor or upon its own initiative, grant such exemptions or exceptions from the requirements of this Part as it determines are authorized by law and will not result in a hazard to public health and safety, e.g., an industrial hygienist who performs radon tests at his employer's facilities in the course of his employment, state and local public health officials who perform radon screening services without charge to the recipient of the service.
- b) The following persons are exempt from the registration requirements of this Part:
 - 1) Persons who sell or distribute, but who do not place, radon sampling devices supplied by a laboratory, but only if the results of the laboratory analysis are reported directly to the owner or occupant of the building sampled; and
 - 2) Persons who manufacture or analyze, but who do not place, radon sampling devices, but only if the results of the laboratory analysis are reported directly to the owner or occupant of the building being sampled.

Section 420.40 Application for Registration

Any person applying for initial registration, or renewal of registration must submit a complete and legible application form, must pay the fee prescribed in Section 420.60, and must provide documentation that he or she has met the requirements for initial registration, or renewal of registration. Such documentation shall include diplomas, transcripts, certificates of completion and work history, as appropriate.

Section 420.50 Issuance of Registration

- a) Registration
 - 1) Except as provided in subsection (b), the Department shall register and shall issue a Certificate of Registration to:
 - A) Any individual who has at least 4 years of radiological safety, environment sampling, or industrial hygiene experience.
 - B) Any individual who has an Associate of Arts degree in a physical or biological science and 2 years of radiological safety, environmental sampling, or industrial hygiene experience.
 - C) Any individual who has a Baccalaureate degree in a physical or biological science or engineering.
 - D) Any individual who has successfully completed a course that covers the following topics:
 - i) Radon Health Effects and Health Risks;
 - ii) Radon Sources;

- iii) Radon Entry Points and Transport Pathways;
- iv) Screening Measurement Techniques and Devices;
- v) Follow-up Measurement Techniques and Devices;
- vi) Diagnostic Measurement Techniques and Devices;
- vii) Quality Assurance;
- viii) Worker Health and Safety; and
- ix) Documentation.

Agency Note: Each of the following courses covers the topics identified above:

- 1) United States EPA Radon Contractor Proficiency Program as described in the "EPA Radon Contractor Proficiency Program," issued September 7, 1990.
- 2) United States EPA Radon Measurement Proficiency Program as described in the "National Radon Measurement Proficiency (RMP) Program, Application and Participation Manual," EPA document #52011-88-056 (December 1988).
- 3) The Illinois Department of Nuclear Safety Measurement Course.

E) Copies of the two U.S. EPA documents are available from the Department. Any person other than an individual, (e.g., a partnership, firm or company) who employs at least one individual, registered in accordance with subsection (a)(1)(A), (B), (C) and (D) above, provided that the registered individual will direct and be responsible for all radon testing activities undertaken by the person and provided further that the registered individual will personally review and approve all test results before they are disclosed to the client.

2) The registration issued pursuant to subsection (a)(1)(A), (B), (C) and (D) shall be valid for a period of 2 years. Registration issued pursuant to subsection (a)(1)(E) shall be valid for one year.

- b) The Department shall deny registration to any person if the Department has evidence that the applicant has engaged in any of the acts listed in Section 420.70(a) unless the condition listed in Section 420.70(a) no longer exists and the applicant submits documentation that he satisfies the requirements of subsection (a) above.
- c) Registration issued pursuant to subsection (a)(1)(A), (B), (C) and (D) shall be renewable for 2 year periods. Registration issued pursuant to subsection (a)(1)(E) shall be renewable for 1 year periods.

Section 420.60 Fees

- a) The fees for registration in all categories shall be non-refundable and shall be as follows:
 - 1) Initial Registration - Individual \$ 100.00
 - 2) Initial Registration - Person Other Than Individual \$ 25.00
 - 3) Renewal of Registration - Individual \$ 100.00
 - 4) Renewal of Registration - Persons Other Than Individual \$ 25.00
- b) The appropriate fees are to accompany the application when filed with the Department.

Section 420.70 Suspension and Revocation of Registration

- a) The Department shall act to suspend or revoke a person's registration for any one or a combination of the following causes:
 - 1) Knowingly causing a material misstatement or misrepresentation to be made in the application for registration, if such misstatement or misrepresentation would impair the Department's ability to assess and evaluate the applicant's qualifications for registration under this Part, such as a misstatement or misrepresentation regarding training or experience;
 - 2) Willfully evading the statute or regulations pertaining to registration, or willfully aiding another person in evading such statute or regulations pertaining to registration;
 - 3) Having been convicted in any State of a crime which is a felony under the laws of this State or having been convicted of a felony in a federal court, unless such individual demonstrates to the Department that he/she has been sufficiently rehabilitated, by restoration of all civil rights, to warrant the public trust; and
 - 4) Misrepresenting the capabilities of a device for detecting and measuring radon or radon progeny or intentionally misrepresenting the results of a test to detect or measure radon or radon progeny.
- b) If, based upon any of the above grounds, action to suspend or revoke registration is initiated, the Department shall notify the person and shall provide an appointment for hearing in accordance with 32 Ill. Adm. Code 200.60. An opportunity for hearing shall be provided before the Department takes action to suspend or revoke a person's registration.
- c) The usual action shall be a suspension of registration for up to one year. The term of suspension shall be reduced by the Director, upon the recommendation of the hearing officer, if the hearing officer finds, based upon evidence presented to him/her at a hearing, and the Director concurs, that the conditions leading to the Preliminary Order for Suspension can be cured in less than one year. However, if the Department finds that the causes are of a serious or continuous nature, such as past actions which posed an immediate threat to public health or safety or deficiencies that cannot be cured within one year, the Department shall revoke the person's registration.
- d) When a person's registration is suspended or revoked, the person shall surrender the certificate of registration to the Department.
- e) A person whose registration has been revoked may seek reinstatement of registration by filing with the Department a petition for reinstatement that complies with the requirements of 32 Ill. Adm. Code 200.40. Such petition may be filed one year or more after the beginning of the revocation period. The person shall be afforded a hearing in accordance with 32 Ill. Adm. Code 200 and shall bear the burden of proof of establishing that the registration should be reinstated due to rehabilitation.

Section 420.80 Civil Penalties

- a) The Department shall assess civil penalties, in accordance with subsection (c), against any unregistered person who sells a device or performs a service, for compensation, for determining the presence of radon or radon progeny, unless such person is exempt from the registration requirements as specified in Section 420.30.

- b) Prior to assessing civil penalties, the Department shall confirm the violation of the registration requirements by:
 - 1) Observation of the violation by a Departmental employee;
 - 2) Obtaining records, documents, or other physical evidence; or
 - 3) Obtaining signed, written statements from persons that allege a violation has occurred.
- c) Civil Penalties as provided in subsection (a) shall be assessed as follows:
 - 1) First violation by an unregistered person - \$500.00
 - 2) Subsequent violation by an unregistered person - \$1,000.00
 - 3) Failure of a registered individual to direct and supervise radon testing activities of the unregistered employee of a registered business or to review and approve test results prepared by an unregistered employee prior to sending them to the client - \$1,000.00.
 - 4) Failure of a registered person (business) to supervise its unregistered employees - \$1,000.00.
- d) The Department shall impose civil penalties by issuing a Preliminary Order and Notice of Opportunity for Hearing as provided in 32 Ill. Adm. Code 200.60. Each day a violation occurs shall constitute a separate offense.

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER c: NUCLEAR FACILITY SAFETY

PART 501
PLAN FOR THE COMPENSATION OF LOCAL
GOVERNMENTS UNDER PROVISIONS OF THE
"ILLINOIS NUCLEAR SAFETY PREPAREDNESS
ACT"

Section

501.10	Purpose and Objectives
501.20	Definitions
501.30	Policies
501.40	Procedures
501.50	Standards for the Determination of Necessary Activities and Authorized Expenses

AUTHORITY: Implementing and authorized by Section 4 of the Illinois Nuclear Safety Preparedness Act (Ill. Rev. Stat. 1989, ch. 111 1/2, par. 4304).

SOURCE: Emergency rule at 5 Ill. Reg. 14862, effective November 22, 1982, for a maximum of 150 days; adopted at 7 Ill. Reg. 5877, effective April 23, 1983; codified at 8 Ill. Reg. 1599; amended at 9 Ill. Reg. 2283, effective January 30, 1985; amended at 14 Ill. Reg. 16923, effective October 2, 1990.

Section 501.10 Purpose and Objectives

The purpose of this Part is to establish the policies and procedures necessary to compensate local governments for authorized expenses incurred in implementation of the Illinois Nuclear Safety Preparedness Act(the Act), (Ill. Rev. Stat., ch. 111 1/2, par. 4301 et seq.) on or after July 1, 1982. The policies and procedures contained in this Part are intended to further the following objectives:

- a) to promptly compensate local governments for authorized expenses incurred in implementation of the Act;
- b) to reduce the encumbrance of public funds obligated by local governments in implementation of the Act by establishment of a voluntary grant system of compensation, whereby grant monies are paid to the local government in advance of actual expenditures;
- c) to provide guidance to local governments and departmental staff in determining necessary activities and expenses payable pursuant to the Act;
- d) to establish a fair and equitable system of claims review;
- e) to establish a uniform method of submission, documentation and authentication of claims.

Section 501.20 Definitions

"Authorized Expenses" means the actual expenditures of public funds by a of local government attributable to implementation of the Act as determined necessary by the Director, Department of Nuclear Safety (Department).

"Director" means the Director of the Department of Nuclear Safety or his designee.

"Drill" means the test or trial of a particular emergency preparedness system, function or operation, such as communications.

"Employee" means an individual actually paid wages or allowances by a local government for work performed on a full-time, part-time or intermittent basis.

"Exercise" means the testing of emergency response plans for nuclear facilities, including, but not limited to, the biennial testing and evaluation of off-site radiological emergency response plans and preparedness in support of nuclear generating stations, as required by the U.S. Nuclear Regulatory Commission, 10 CFR 50, Appendix E, current as of January 1, 1990, exclusive of subsequent amendments or editions.

"Local Government" means a political subdivision below the State Government level, such as a county, municipality, township, village or district, with authority to expend public funds.

(Source: Amended at 14 Ill. Reg. 16923, effective October 2, 1990)

Section 501.30 Policies

- a) The Director shall review all claims for compensation submitted by local governments in accordance with this Part. To the extent that the General Assembly has made appropriations therefor, the Director shall compensate local governments for expenses relating to activities determined to be necessary. Necessary activities shall include, but not be limited to, the activities specified in Section 501.50(b). The Department shall compensate local governments from fees collected pursuant to Section 4 of the Act, *except that such compensation, in the aggregate, shall not exceed \$250,000 in any year.*
- b) The Division of Planning and Analysis (DPA), Office of Nuclear Facility Safety, shall be responsible for implementation of this Part and shall be the point of contact for local governments relative to the provisions contained herein.
- c) This Part shall be reviewed by the Department annually to determine its effectiveness in accomplishing stated objectives. Local governments eligible for compensation under this Part are invited to submit their comments and suggestions at any time. Noted deficiencies will be promptly corrected and improved methods and procedures incorporated to enhance program administration.
- d) All grants made under this Part providing for payment of funds in advance of anticipated expenditures shall be made in accordance with a grant agreement to be executed by both the Director of the Department and the head of the local government to whom the grant is awarded.

(Source: Amended at 14 Ill. Reg. 16923, effective October 2, 1990)

Section 501.40 Procedures

- a) Procedure for compensating local governments by reimbursement:
 - 1) In order to be eligible for reimbursement of expenses incurred by local government, the head of the local government shall provide to the Department the name, title, business address and phone number of the person designated to authenticate claims for reimbursement submitted on behalf of the local government and to act as the point of contact for questions arising therefrom. This information shall be submitted, on the prescribed form furnished by the Department, to the

Illinois Department of Nuclear Safety,
Attention: Division of Planning and Analysis, 1035
Outer Park Drive, Springfield, Illinois 62704.

- 2) Claims are to be submitted to the Department, Attention: Division of Planning and Analysis, 1035 Outer Park Drive, Springfield, Illinois 62704 on the prescribed forms furnished by the Department. Forms may be obtained from the Division of Planning and Analysis or reproduced locally at the option of the user. An initial supply will be furnished with distribution of this Part. Claims may be consolidated for each expense category, i.e. personnel services, individual travel, equipment use, etc., by the local government or, if more convenient, decentralized by operating elements under jurisdiction of the local government entity, e.g., Police Department, Fire Department, Public Works Department, etc. Either method requires the attachment of a cover and summary sheet authenticated by the official designated by the local government head.
 - 3) The Division of Planning and Analysis shall review claims for completeness, accuracy, conformance with the requirements of this Part. The Division of Planning and Analysis shall attempt to resolve any questions surfacing from this review by communicating with the point of contact designated by the head of the local government. Upon completion of this review, the Division of Planning and Analysis will forward the claim along with its recommendations to the Director.
 - 4) Claims approved in their entirety by the Director will be immediately processed for payment through the Fiscal Services Division and the Division of Planning and Analysis shall be advised accordingly.
 - 5) Claims with unresolved questions remaining after review of the Director, will be forwarded to a departmental official, appointed by the Director, for further investigation of the excepted expenses. Upon completion of the inquiry, the claims will be returned to the Director with the findings and recommendations of the investigating official. After final review by the Director, claims with exceptions will be processed for payment of those expenses determined to be appropriate and consistent with law. The Director shall advise the claimant, in writing, of any exceptions, and the basis for the exceptions and a copy of the Director's decision shall be furnished to the Division of Planning and Analysis.
 - 6) Local governments shall submit claims for compensation covering authorized expenses as soon as practicable following the actual expenditure of public funds. In any event, claims for expenses incurred on or before June 30 of any State fiscal year must be received by the Department within 60 days following the close of the State fiscal year to which they pertain to ensure timely review and processing.
- b) Procedure for grants awarding funds in advance of expenditures:
- 1) Participating local governments shall, by March 1st of each year, submit a grant application to the Department for the purpose of receiving compensation in advance of anticipated expenditures for the ensuing State fiscal year. The application shall contain a description of the purpose for which the grant is being sought, the

proposed term of the grant and an annual spend plan covering the estimated expenses of the participating local government. The annual spend plan shall be submitted on a form provided by the Department. The grant application shall also include the name, title, business address and phone number of the person designated to authenticate documents submitted on behalf of the local government and to act as point of contact for questions arising under the grant. The application shall be signed by the head of the local government.

- 2) After receipt of the application, the Division of Planning and Analysis shall review the application to determine whether award of the grant would further the purposes expressed in Section 4 of the Act. No later than June 1st of each year, the Division of Planning and Analysis shall make recommendations to the Director regarding action to be taken on the applications. The recommendations regarding award of grants shall be based on the purposes specified in the Act, the standards specified in Section 501.50 and on availability of funds.
- 3) After review of recommendations made by the Division of Planning and Analysis, the Director shall execute a grant agreement with each local government to whom a grant is awarded. The grant agreement shall specify the parties to the grant, the term of the grant, the amount of the grant, method of payment of grant monies, permissible uses of grant monies, that documentation of expenditures be submitted to the Department, that unspent grant monies shall be returned to the State as required by the Illinois Grant Funds Recovery Act (Ill. Rev. Stat., ch. 127, par. 2304), that the Department may audit records to verify that grant monies were used for permissible uses under the grant, and that the grant agreement shall cease if funds for the grant are not appropriated by the General Assembly, and any other standard provisions required by the comptroller to be included in contracts entered into by the State.
- 4) Upon execution of the grant agreement, the Department shall allocate funds to a grant account established for the participating local government in an amount equal to the grant award. On July 1st of each year, or as soon thereafter as is practicable, the Department shall disburse to the local government an amount equal to the approved grant expenses that are anticipated to be incurred during the first fiscal quarter. On October 1st, or as soon thereafter as is practicable, the Department shall disburse to the local government an amount equal to the approved grant expenses that are anticipated to be incurred during the second fiscal quarter. On January 1st, or as soon thereafter as is practicable, the Department shall disburse to the local government an amount equal to the approved grant expenses anticipated to be incurred during the third quarter less any amount previously disbursed for 1st quarter expenses for which documentation has not been submitted to the Department and approved by the Department in accordance with subsection (b)(5). On April 1st, or as soon thereafter as is practicable, the Department shall disburse to the local government an amount equal to the approved grant expenses anticipated to be incurred during the fourth quarter less any amounts previously disbursed for 1st and 2nd quarter expenses for

which documentation has not been submitted to the Department and approved by the Department in accordance with subsection (b)(5).

AGENCY NOTE: It is the Department's intent that grant funds will be disbursed on the first day of each quarter. However, such disbursement might be delayed for reasons beyond the Department's control, e.g., failure of the General Assembly to make appropriations before July 1, failure of a local government to submit a complete grant application by March 1st.

- 5) Participating local governments shall submit documentation of expenditures under the grant. Such documentation shall be on the forms provided by the Department and shall be submitted no later than 20 days following the close of the state fiscal quarter in which the expenditure of public funds was made. Within 30 days of receiving the documentation, the Department shall notify the local government, in writing, whether the documentation has been approved or disapproved. The Department shall also notify the local government, in writing, whether the future disbursements of the grant award are subject to adjustment under subsection (b)(4), and if so, what the adjusted disbursement will be.

(Source: Amended at 14 Ill. Reg. 16923, effective October 2, 1990)

Section 501.50 Standards for the Determination of Necessary Activities and Authorized Expenses

- a) The following standards are used by the Department in determining necessary activities and authorized expenses, payable under the provisions of this Part. These standards are designed to achieve equality among known prospective claimants while taking into account the limitations imposed by the availability of appropriated funds.
- b) Necessary Activities:
 - 1) Response planning, preparation, radiological training and drills.
 - 2) Participation in the exercising of transportation and fixed facility nuclear response plans.
 - 3) Internal post exercise critique and corrective action.
- c) Authorized Expenses:
 - 1) Personnel Services
 - A) Wages, plus fringe benefits, actually paid to local governmental employees for participation in necessary activities as described in subsection(b).
 - B) Compensation shall be based on hourly rates for the number of hours of actual participation in necessary activities as described in subsection (b).
 - C) Compensation for "matching funds" type employees shall be limited to wages actually paid from the local government's share of total funds contributed.
 - 2) Individual Travel
 - A) Travel allowances actually paid to local government employees for travel performed in connection with their participation in necessary activities as described in subsection(b).
 - B) Compensation for transportation, lodging, and per diem or meal expenses shall not exceed the rate in the State of Illinois Travel

Regulations, 80 Ill. Adm. Code 3000, in effect at the time the expenditure was incurred unless a local government ordinance, rule or regulation applicable to all employees of the local government specifies a higher rate.

3) Equipment Use

- A) Costs actually paid, incurred or obligated for local government owned or leased equipment used during or in connection with a necessary activity as specified in subsection (b).
- B) Compensation for equipment use shall not exceed the rates indicated in the following table without complete documentation:

Type Equipment	Rate	Optional Rate
Automobile	\$0.30 per mile	\$3.20 per hour of actual operation
Bus	\$0.60 per mile	\$8.80 per hour of actual operation
Emergency Vehicle (ambulance, fire truck, rescue vehicle)	Base rate, fee or service charge customary to the area of operation.	None

- C) Expenses for use of motorized equipment not listed in the table above shall be fully documented. Such documentation shall include the date of use, type of equipment, entity that used the equipment, miles or hours that the equipment was used, and cost per mile or hour for equipment use.

4) Miscellaneous Expenses

- A) Emergency Operation Center (EOC) Telecommunications¹
 - i) Installation, service and maintenance charges for those telecommunication lines, circuits and equipment used exclusively for exercising nuclear emergency response plans.
 - ii) Telecommunication lines or circuit usage charges relating exclusively to the exercising of nuclear emergency response plans.
- B) EOC Operational Materials: costs of maps, charts, plexiglass, status boards and similar materials relating exclusively to the exercising of nuclear emergency response plans.

5) Other Expenses

- A) Claims for expenses not specifically covered herein, shall be reviewed on a case by case basis to determine whether they relate, in whole or in part, to necessary activities as specified in subsection (b).
- B) Request for compensation of such expenses shall be accompanied by documentation of the amount of funds to be expended as well as a statement identifying the relationship of the expense to the activities listed in subsection (b). Prior to incurring such expenses, the local government shall submit the request for compensation to the Illinois Department of Nuclear Safety, Attention,

Ch. II, Sec. 501.50

Division of Planning and Analysis, 1035
Outer Park Drive, Springfield, Illinois
62704.

(Source: Amended at 14 Ill. Reg. 16923, effective October 2,
1990)

TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER c: NUCLEAR FACILITY SAFETY

PART 504
STATUS SIGNALS FOR NUCLEAR POWER
REACTORS

Section	
504.10	Policy and Scope
504.20	Definitions
504.30	Protocol for Data Transmissions
504.40	Equipment
504.50	Updating Station Catalogues and System Status Signals Catalogue
504.60	Implementation of System Status Signals Catalogue
504.70	Availability

AUTHORITY: Implementing and authorized by Section 8(c) of the Illinois Nuclear Safety Preparedness Act (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 4308).

SOURCE: Adopted at 16 Ill. Reg. 11544, effective July 7, 1992.

Section 504.10 Policy and Scope

- a) The Department of Nuclear Safety (Department) has the responsibility under State law to acquire from each nuclear power reactor in the State all system status signals which initiate Emergency Action Level Declarations, actuate accident mitigation and provide mitigation verification, including indications of operating power levels.
- b) Signals shall be provided by each owner in a manner that assures availability to the Department during all modes of reactor operation (including defueled conditions) as well as throughout accidents and subsequent recovery operations.
- c) This Part provides the criteria and requirements under which each owner of a nuclear power reactor shall transmit to the Department a System Status Signals Catalogue for the reactor via a Reactor Data Link (RDL).
- d) This Part shall apply to all owners. For any nuclear power reactor for which no License to Operate has been issued by the United States Nuclear Regulatory Commission on the effective date of this Part, a System Status Signals Catalogue shall be transmitted by the owner to the Department prior to commencing initial fuel load.
- e) For any nuclear power reactor providing an RDL, the owner shall continue to transmit a System Status Signals Catalogue after the License to Operate is no longer maintained and until such time that all fuel is removed from the site or until the owner no longer possesses the capability to supply such data.

Section 504.20 Definitions

As used in this Part, the following definitions will apply:

"Communication Link" means the telephone line or other connection between the Department supplied modem on the owner's premises to the Department's headquarters in Springfield, Illinois.

"Department" means the Illinois Department of Nuclear Safety.

"Owner" means the owner and operator of the nuclear power reactor.

"Point" means the system parameter being monitored.

"RDL" means the Reactor Data Link for a reactor. The RDL includes the entire system by which the owner provides and the Department receives a System Status Signals Catalogue at the Department's headquarters in Springfield, Illinois.

"RDL outage" means any breakdown in the RDL that prevents the normal continuous data transmission of the System Status Signals Catalogue to the Department's headquarters in Springfield, Illinois.

"Reactor" means a nuclear power reactor.

"Station Catalogue" means the complete and inclusive list of all computer monitored points available for transmission from a nuclear power station from which the System Status Signals Catalogue for each reactor is chosen.

"Station Computer" means the computer or computers which collect and transfer data to the Department's modems.

"System Status Signals Catalogue" means the points selected by the Department from the Station Catalogue to be transmitted over the Communications Link. A System Status Signals Catalogue is selected for each reactor.

Section 504.30 Protocol for Data Transmissions

Communications protocol, data representation and data transmission frequency for the System Status Signals Catalogue shall be established and/or changed by mutual consent of the Department and the owner subject to the condition that the owner shall provide signals to the Department in a manner and at a frequency that allows the Department to incorporate the signals into and augment the Department's remote effluent monitoring system.

Section 504.40 Equipment

- a) The Department shall provide a modem to the owner and shall establish a Communication Link. All Department owned equipment shall be maintained by the Department.
- b) Departmental personnel and agents shall have access to all Departmental equipment located at the nuclear station site, subject to any security requirements imposed by law, regulation, or normal security practices of the owner including Fitness-For-Duty requirements.
- c) The owner shall provide and maintain necessary hardware and software at its reactor site to communicate via the Department supplied modem.

Section 504.50 Updating Station Catalogues and System Status Signals Catalogue

- a) For each point included in the Station Catalogue, the Station Catalogue shall contain, as a minimum, the name of the point; a description of each parameter (point) measured, sensed or calculated; the units of measure for analog points; the state indication for digital points, e.g., open or closed, on or off; and the type of point, e.g., analog or digital.

- b) On the effective date of this Part, the Department will consider the current Station Catalogue for each nuclear power station to be the most recent Station Catalogue that was provided the Department pursuant to the prerulemaking arrangement between the owner and the Department.
- c) The owner shall provide the Department an updated Station Catalogue for each nuclear power station at 180 day intervals. In the event that the Station Catalogue remained unchanged, the owner shall notify the Department that no changes were made in lieu of providing an updated Station Catalogue. The end of each 180 day interval shall be consistent with the end of the prerulemaking 180 day interval already in effect for the owner under the prerulemaking arrangement between the owner and the Department. The Department may lengthen the Station Catalogue submission interval at any time.
- d) Within 14 calendar days after receipt of an updated Station Catalogue, the Department shall provide the owner with notice of any changes to the System Status Signals Catalogue(s).
- e) The Department shall select points for the System Status Signals Catalogue from the updated Station Catalogue using the following criteria:
 - 1) those points by which the off-site radiological consequences can be determined;
 - 2) those points by which challenges to, and failures of, the clad, the primary boundary, and the containment structures can be determined;
 - 3) those points by which short and long-term decay heat removal capabilities can be determined; or
 - 4) those points by which on and off-site station electrical power status can be determined.
- b) In the event of an RDL outage, or station computer outage, the owner, when required by the Department, shall establish a point of technical contact with the Department to communicate reactor status information until the RDL is restored.
- c) In the event of a planned or unplanned station computer outage, data transmission to the Department shall be restored as soon as possible after the station computer's return to service.
- d) The Department's access to the System Status Signals Catalogue shall not be intentionally degraded by the owner's computer usage unless such usage is necessary to protect public health and safety as required under the Nuclear Regulatory Commission license, and the degradation of access cannot be avoided.

Section 504.60 Implementation of System Status Signals Catalogue

Except as provided in this Section, the owner shall coordinate the transmission of a new System Status Signals Catalogue no later than 14 calendar days after receiving the notice provided for in Section 504.50(d). If the owner determines that it cannot transmit the new System Status Signals Catalogue in the 14 calendar day period, the owner shall, prior to the expiration of the 14 calendar day goal, apply in writing to the Department for an extension of time to transmit the new System Status Signals Catalogue.

- a) A written request to extend the time for implementation shall include an estimate of the amount of time needed by the owner to begin transmitting the new System Status Signals Catalogue and the reasons why the additional time is needed for implementation.
- b) Timely submittal to the Department of a written request described in subsection (a) will result in an automatic 14 day extension of the time for implementation by the owner.

Section 504.70 Availability

- a) Each owner shall transmit a System Status Signals Catalogue for each reactor over a Communications Link continuously 24 hours a day during all modes of reactor operation (including defueled conditions) as well as throughout accident and subsequent recovery operations, except during planned station computer and RDL system outages or unplanned station computer and RDL system outages beyond the control of the owner. The owner shall establish measures to assure that unplanned RDL system outages are promptly identified and corrected and that the root cause of the RDL outage is determined and corrective action taken to preclude repetition where appropriate.

TITLE 32: ENERGY**CHAPTER II: DEPARTMENT OF NUCLEAR SAFETY****SUBCHAPTER c: NUCLEAR FACILITY SAFETY****PART 505****SAFE OPERATION OF NUCLEAR FACILITY BOILERS AND PRESSURE VESSELS****SUBPART A: GENERAL**

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SUBPART B: ISI BOILERS AND PRESSURE VESSELS

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505.1800	Authorized Inspectors
505.1900	Authorized Inspection Agencies

SUBPART C: NON-ISI BOILERS AND PRESSURE VESSELS

Section	
505.2000	Standards for Design, Construction, Operation and Inspection
505.2100	Registration Requirements
505.2200	Inspection Certificates
505.2300	Operation Requirements
505.2400	Inspection Requirements
505.2500	Repairs and Alterations
505.2600	Code Case Applications
505.2700	Use of Alternative Standards for Construction, Inspection and Repair
505.2800	Authorized Inspectors
505.2900	Authorized Inspection Agencies

AUTHORITY: Implementing and authorized by Section 8(a)(8) of the Illinois Nuclear Safety Preparedness Act 420 ILCS 5/8(a)(8), Sections 2a and 2b of the Boiler and Pressure Vessel Safety Act 430 ILCS 75/2a and 2b, and by Section 71(C) of the Civil Administrative Code of Illinois 20 ILCS 2005/71(C).

SOURCE: Emergency Rule adopted at 17 Ill. Reg. 15667, effective September 10, 1993, for a maximum of 150 days; adopted at 18 Ill. Reg. 2317, effective February 7, 1994; amended at 20 Ill. Reg. 6455, effective April 26, 1996.

SUBPART A: GENERAL**Section 505.10 Scope**

This Part shall apply to all boilers and pressure vessels contained within or upon or in connection with nuclear facilities within this State except as provided in Section 505.50 and elsewhere in this Part. This Part sets forth standards for the safe and proper design, construction, installation, inspection, inservice examination and testing, repair and alteration of boilers and pressure vessels which are consistent with ASME Boiler and Pressure Vessel Code and National Board Inspection Code requirements as adopted and enforced by the Nuclear Regulatory Commission (NRC). This Part provides for the registration of boilers and pressure vessels. This Part also provides for the issuance of Inspection Certificates for nuclear power systems and non-ISI boilers and pressure vessels to document that such power systems, boilers and pressure vessels comply with this Part.

Section 505.20 Policy

- a) It is the intent of the Department of Nuclear Safety to implement this program in accordance with State law which provides that *notwithstanding any other provision to the contrary, the Department of Nuclear Safety shall have sole (State) jurisdiction over all boilers and pressure vessels contained within or upon or in connection with any nuclear facility within this State. The Department of Nuclear Safety shall have the same authority and shall have and exercise the same powers and duties in relation to those boilers and pressure vessels under this (the Boiler and Pressure Vessel Safety)*

Act as the Board (of Boiler and Pressure Vessel Rules) or the (Office of the) State Fire Marshal have and exercise in relation to all boilers and pressure vessels in this State that are not included in this Section. (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 3202(a)) 430 ILCS 75/2(a).

- b) This Part is intended to implement Sections 2a and 2b of the Boiler and Pressure Vessel Safety Act in a manner consistent with the State role provided for in the ASME Code and National Board Inspection Code. The Department intends to review Inservice Inspection Plans, reports and other documentation, as provided in this Part, to determine, in coordination and cooperation with the NRC, compliance with the ASME Code, National Board Inspection Code and other applicable codes and standards referenced in Section 505.40.
- c) This Part is not intended to be, in any way, inconsistent with the applicable regulations, rules and requirements of the NRC. If a requirement of this Part as applied in any situation is or would be inconsistent with the regulations, rules and requirements of the NRC, the requirements of this Part shall not be applied. In addition, if the application of any requirement of this Part could affect the safety or the operation of the nuclear facility, as determined by the NRC, the Department shall apply the requirements only with the prior concurrence of the NRC, as provided for in Section 505.86

Section 505.30 Definitions

The following definitions shall apply to this Part:

"Act" or "the Act" means the Boiler and Pressure Vessel Safety Act (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 3201 et seq.) 430 ILCS 75 .

"Alteration" means a change to a boiler or pressure vessel made necessary by, or resulting in, a change in design requirements. Non-physical changes such as rerating of a boiler or pressure vessel shall be considered an alteration. The addition of nozzles smaller than a reinforced opening size shall not be considered an alteration.

"ANSI" means the American National Standards Institute, 1430 Broadway, New York NY 10018.

"Appurtenance" means an item attached to a stamped component that has work performed on it requiring verification by an Authorized Inspector.

"ASME" means the American Society of Mechanical Engineers, 345 E. 47th Street, New York NY 10017.

"ASME Code" means the American Society of Mechanical Engineers Boiler and Pressure Vessel Code with addenda thereof made, approved and

adopted by the Council of the Society and adopted and incorporated by the Department in Section 505.40. Copies of the ASME Code may be obtained from the American Society of Mechanical Engineers.

"ASME Code Case" or "Code Case" means a document published by ASME to clarify the intent of the ASME Code or to provide alternative requirements to those specifically indicated in the ASME Code due to special circumstances or for the use of new technology.

"Authorized Inspection Agency" means one of the following:

A department or division established by a jurisdiction which has adopted one or more Sections of the ASME Code and whose inspectors hold valid commissions issued by the National Board of Boiler and Pressure Vessel Inspectors. In Illinois, the Division of Boiler and Pressure Vessel Safety of the Office of the State Fire Marshal is the jurisdiction except for the City of Chicago; or

An inspection agency of an insurance company which is authorized (licensed) to insure and is insuring boilers and pressure vessels at nuclear facilities in this State and employs inspectors who meet the requirements of Section 505.180 and Section 505.1800 or 505.2800, as applicable; or

An owner of boilers or pressure vessels who maintains a regularly established inspection department, whose organization and inspection procedures meet the requirements established by the Office of the State Fire Marshal.

"Authorized Inspector" means an individual who is employed by an Authorized Inspection Agency, holds a current Illinois Certificate of Competency issued by the Office of the State Fire Marshal pursuant to 41 Ill. Adm. Code 120.20 and meets the requirements of Section 505.180 and Section 505.1800 or 505.2800, as applicable.

"Boiler" means a closed vessel used to heat water or other liquids or to generate steam or other vapors under pressure or vacuum by the application of heat resulting from the combustion of fuels, electricity, atomic energy or waste gases.

"Power boiler" means a boiler in which steam or other vapor is generated at a pressure of more than 15 psig and includes water boilers operating at pressures exceeding 160 psig or temperatures exceeding 250~ F at or near the boiler outlet.

"High pressure, high-temperature water boiler" means a water boiler operating at pressures exceeding 160 psig or temperatures exceeding 250~ F at or near the boiler outlet.

"Heating boiler" means a steam heating boiler operated at pressures not exceeding 15 psig, or a hot water heating boiler operated at pressures not exceeding 160 psig or temperatures not exceeding 250~ F at or near the boiler outlet.

"Hot water supply boiler" means a boiler (including fired storage water heater) furnishing hot water to be used externally to itself at pressures not exceeding 160 psig or temperatures not exceeding 250~ F at or near the boiler outlet.

"Certificate inspection" means an inspection, the report of which is used by the Department as justification for issuing, withholding or revoking the Inspection Certificate.

"Condemned boiler or pressure vessel" means any boiler or pressure vessel, including related appurtenances, that has been inspected and declared unsafe or disqualified by legal requirements, by the Department.

"Department" means the Department of Nuclear Safety of the State of Illinois.

"Design pressure" means the pressure used in the design of a boiler or pressure vessel for the purpose of determining the minimum permissible thickness or physical characteristics (e.g., material properties) of different parts of the vessel, in accordance with design standards of the ASME Code.

"Director" means the Director of the Department of Nuclear Safety of the State of Illinois.

"External inspection" means as complete an examination as can reasonably be made of the external surfaces of a boiler or pressure vessel. This examination shall be made while it is in operation, if possible.

"Inoperative" means a boiler or pressure vessel that itself or an attached appurtenance is no longer capable of functioning within its design requirements. The inability of support equipment to operate does not cause a boiler or pressure vessel to be considered inoperative.

"Inservice inspection interval" means the period of time during which inservice examinations and system pressure tests are performed, as defined by the owner in accordance with the ASME Code Section XI.

"Inservice inspection period" means a subdivision of the inservice inspection interval, as defined by the owner in accordance with the ASME Code Section XI.

"Inservice Inspection Plan" means the documents prepared by the owner in accordance with paragraph IWA-2420 of the edition and addenda of Section XI approved by the NRC for use by the plant (10 year plan).

"Inspection" means examination and evaluation of documents and hardware by an Authorized Inspector to determine conformance of an item or an activity to the requirements of this Part.

"Inspection Certificate" means a certification issued by the Department for the operation of a non-ISI boiler or pressure vessel or nuclear power system.

"Internal inspection" means as complete an examination as can reasonably be made of the internal surfaces of a boiler or pressure vessel while it is shut down and manhole plates, handhole plates or other inspection opening closures are removed as required by the Authorized Inspector.

"ISI boiler or pressure vessel" means any boiler or pressure vessel, including related appurtenances, that is in the owner's Inservice Inspection Plan.

"Maintenance" means routine activities conducted on an item that are performed and controlled in accordance with the owner's procedures, including minor restorative actions, that are not otherwise classified as a repair, replacement or alteration.

"Maximum Allowable Working Pressure" or "MAWP" means the maximum gauge pressure permissible (in accordance with the design requirements) at the top of a vessel in its operating position at the design temperature. This pressure is the least of those calculated for every element of the vessel using nominal thickness exclusive of allowances for corrosion and thickness required for loadings other than pressure. It is the basis for the pressure setting of the pressure relieving devices (e.g., pressure relief valves) protecting the vessel. The design pressure may be used in place of the maximum allowable working pressure in all cases for which calculations are not made to determine the value of the maximum allowable working pressure.

"National Board" means the National Board of Boiler and Pressure Vessel Inspectors, 1055 Crupper Avenue, Columbus OH 43229.

"National Board Inspection Code" means the National Board Inspection Code: A Manual for

Boiler and Pressure Vessel Inspectors, published by the National Board and adopted and incorporated by the Department in Section 505.40. Copies may be obtained from the National Board.

"NFPA" means the National Fire Protection Association, 1 Batterymarch Park, Quincy MA 02269.

"Non-ISI boiler or pressure vessel" means any boiler or pressure vessel, including related appurtenances, that is not in the owner's Inservice Inspection Plan.

"Non-standard boiler or pressure vessel" means any boiler or pressure vessel, including related appurtenances, that does not bear the ASME Code Symbol Stamp.

"NRC" means the United States Nuclear Regulatory Commission or any agency which succeeds to its function in the licensing of nuclear power reactors or facilities, or facilities for spent nuclear fuel.

"Nuclear facility" means a nuclear power station. There may be one or more nuclear power systems at a nuclear power station.

"Nuclear power system" means all ISI boilers and pressure vessels in a unit, including their appurtenances, at a nuclear facility that are inspected in accordance with an Inservice Inspection Plan. Such components are generally associated with systems that serve the purpose of producing and controlling the output of thermal energy from nuclear fuel and associated systems essential to the function and overall safety of the nuclear power system.

"Owner" means any organization, person, firm or corporation legally responsible for the safe operation of any boiler or pressure vessel at a nuclear facility within the State.

"PSIG" means pounds per square inch gauge and is a measure of pressure.

"Pressure relief valve" means a safety valve, relief valve or safety relief valve.

"Pressure vessel" means an enclosed vessel in which pressure is obtained from an external source, or by applying heat from an indirect source or from a direct source other than boilers as defined above. Reactor containments are not considered pressure vessels.

"Quality Assurance Program" means a controlled system of planned and systematic actions required to provide adequate confidence that the items designed and constructed are in accordance with the

rules of the ASME Code Section III; or all the planned and systematic actions necessary to provide adequate confidence that a structure, system or component will perform satisfactorily in service in accordance with Appendix B of 10 CFR 50, as applicable.

"Reinstalled boiler or pressure vessel" means any boiler or pressure vessel, including related appurtenances, removed from its original setting and reinstalled at the same location or at a new location within the State of Illinois without change of ownership.

"Relief valve" means an automatic pressure relieving device actuated by the static pressure upstream of the valve which opens further with the increase in pressure over the opening pressure. It is used primarily for liquid service.

"Repair" means the process of restoring a nonconforming item by welding or brazing such that existing design requirements are met.

"Report of Inspection" means a report prepared by an Authorized Inspector which documents that a non-ISI boiler or pressure vessel meets the requirements of this Part for installation and periodic inspection.

"Reportable event" means any accident which either causes a boiler or pressure vessel to become inoperative due to damage from an explosion, catastrophic event or failure due to material condition, of either itself or an attached appurtenance, or results in death or bodily injury to a person.

"Rerating" means the increase of the MAWP or temperature of a boiler or pressure vessel regardless of whether physical work is performed on the boiler or pressure vessel. Rerating shall be considered an alteration.

"Safety relief valve" means an automatic pressure actuated relieving device suitable for use as a safety or relief valve, depending on application.

"Safety valve" means an automatic pressure relieving device actuated by the static pressure upstream of the valve and characterized by full opening pop action. It is primarily used for gas or vapor service.

"State Special" means a boiler or pressure vessel, including related appurtenances, of special construction that may not be constructed in accordance with the ASME Code. See Sections 505.170, 505.1700 and 505.2700 for the procedures for granting a State Special.

"Special Inspector" means an Inspector holding an Illinois Certificate of Competency and a Commission issued by the Office of the State Fire Marshal (OSFM) and who is regularly employed by an insurance company which is authorized (licensed) to insure and is insuring boilers and pressure vessels at nuclear facilities in this State.

"Technical specifications" means part of the Updated or Final Safety Analysis Report and Operating License issued by the NRC that designates safety limits, limiting safety system settings, limiting conditions for operation and surveillance requirements for the safe operation of the nuclear facility.

"Underwriters Laboratories" (U.L.) means a non-profit independent organization testing for public safety. It maintains and operates laboratories for the examination and testing of devices, systems and materials to determine their relationship to life, fire and casualty hazards.

"Updated or Final Safety Analysis Report" means a report required by the NRC in accordance with 10 CFR 50.34.

"Welding" means a group of processes wherein coalescence is produced by heating with an arc or arcs, with or without the application of pressure and with or without the use of filler metal.

Section 505.40 Standards Incorporated by Reference

The Department hereby adopts and incorporates by reference the following codes and standards.

- a) In accordance with the authority granted under Section 2a of the Act, the Department adopts the Boiler and Pressure Vessel Code of the American Society of Mechanical Engineers with addenda thereto made. Those Sections of the ASME Code listed below are incorporated into and constitute a part of the whole rules and regulations of the Department.

- 1) ASME Boiler and Pressure Vessel Code, 1952 Edition including all addenda editions through the ASME Boiler and Pressure Vessel Code, 1995 Edition, for the following:
AGENCY NOTE: The edition and addenda of the ASME Boiler and Pressure Vessel Code applicable to a particular component can be traced using the date of construction of the component in light of Sections 505.170, 505.1000 and 505.2000 of this Part. For more information see Sections 505.170, 505.1000 and 505.2000 of this Part.

- A) Section I, Rules for Construction of Power Boilers;
- B) Section II, Material Specifications
Part A - Ferrous
Part B - Nonferrous

Part C - Welding Rods, Electrodes and Filler Metals

Part D - Properties;

- C) Section III, Rules for Construction of Nuclear Power Plant Components, Division 2 - Concrete Reactor Vessels and Containments;
- D) Section IV, Rules for Construction of Heating Boilers;
- E) Section V, Nondestructive Examination;
- F) Section VI, Recommended Rules for Care and Operation of Heating Boilers;
- G) Section VII, Recommended Guidelines for Care of Power Boilers;
- H) Section VIII, Rules for Construction of Pressure Vessels
Division 1 - Including Appendix M
Division 2 - Alternative Rules;
- I) Section IX, Welding and Brazing Qualifications; and
- J) Section X, Fiberglass-Reinforced Plastic Pressure Vessels.

- 2) ASME Boiler and Pressure Vessel Code, editions and addenda referenced in Title 10 of the Code of Federal Regulations (CFR) Part 50, Section 50.55a (10 CFR 50.55a), revised as of January 1, 1995, including all limitations and modifications contained therein, for the following:

- A) Section III, Rules for Construction of Nuclear Power Plant Components, Division 1 - Nuclear Power Plant Components; and
- B) Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, Division 1 - Rules for Inspection and Testing of Light-Water Cooled Plants.

AGENCY NOTE: The Department will review programs at specific plants on the basis of the edition and addenda of Sections III and XI approved by the NRC for the specific plant.

- b) The Department adopts The National Board Inspection Code, 1992 edition with the 1992, 1993 and 1994 addenda, published by the National Board, except that in all cases "should" shall be read as "shall", "jurisdiction" shall be read as "Department" and reference to Chapter III within Chapter II shall be read as reference to Section 505.150, 505.1500 or 505.2500 of this Part.
- c) The Department adopts the following nationally recognized standards and their addenda:
 - 1) ASME CSD-1a, 1993, Controls and Safety Devices for Automatically Fired Boilers;
 - 2) NFPA 8501-92, Single Burner Boilers - Furnaces;
 - 3) NFPA 85-C, 1991, Multiple Burner Boilers - Furnaces; and
 - 4) NFPA 85-F, 1988, Pulverized Fuel Systems.

- d) The Department adopts ANSI/ASME N626, Qualification and Duties of Authorized Nuclear Inspection Agencies and Personnel, 1974 Edition including all addenda and editions through the N626a-1991 addendum.

AGENCY NOTE: The edition and addenda of ANSI/ASME N626 applicable to the qualifications of the authorized nuclear inspection agency and its personnel can be traced using the edition and addenda of the ASME Boiler and Pressure Vessel Code applicable to a particular component.

- e) For documents included in subsections (a) through (d) of this Section, the Department is incorporating only those editions and addenda indicated. The Department is not incorporating any subsequent edition or addendum to these documents. All documents are available for public review at the Department offices, 1035 Outer Park Drive, Springfield, Illinois.

AGENCY NOTE: This Section is applicable to the following nuclear power plants: Braidwood Station, Units 1 & 2; Byron Station, Units 1 & 2; Clinton Station, Unit 1; Dresden Station, Units 1, 2 & 3; LaSalle County Station, Units 1 & 2; Quad Cities Station, Units 1 & 2; and Zion Station, Units 1 & 2.

(Source: Amended at 20 Ill. Reg. 6455, effective April 26, 1996)

Section 505.50 Exemptions

The following exemptions to requirements in this Part shall be permitted except as defined below or as otherwise provided in this Part. The exemptions provided in subsections (a)(1), (2), (3) and (4) of this Section shall not be permitted for ISI boilers and pressure vessels.

- a) Except as provided in Section 505.70 of this Part, the following boilers and pressure vessels shall be exempt from the requirements of this Part:
- 1) Those classes of pressure vessels not within the scope of ASME Code Section VIII, Division I as defined in the introduction under paragraph U-1.
 - 2) Boilers and pressure vessels which have either a Limiting Condition for Operation (LCO) or a surveillance requirement in the plant's technical specifications.
 - 3) Pressure vessels that do not exceed:
 - A) A volume of 15 cubic feet and 250 psig when not located in a place of public assembly; or
 - B) A volume of 5 cubic feet and 250 psig when located in a place of public assembly; or
 - C) A volume of 1-1/2 cubic feet and 600 psig.
 - 4) Water conditioning equipment used for removing minerals, chemicals, or organic or inorganic particulate from water by means other than application of heat, e.g., water

softeners, water filters, dealkalizers and demineralizers, provided that:

- A) The temperature of such vessels is maintained below 212 degrees fahrenheit;
 - B) No heat is applied to the water after being placed into such vessels; and
 - C) No heat is applied either directly or indirectly to such vessels.
- 5) Hot water supply boilers which are directly fired with oil, gas or electricity, when none of the following limitations are exceeded:
- A) Heat input of 200,000 BTU/hr.; or
 - B) Water temperature of 200~ F; or
 - C) Nominal water containing capacity of 120 gallons.
- 6) Coil type hot water boilers where the water can flash into steam when released directly to the atmosphere through a manually operated nozzle, provided the following conditions are met:
- A) There is no drum, headers or other steam spaces;
 - B) No steam is generated within the coil;
 - C) Outside diameter of tubing does not exceed 1 inch;
 - D) Pipe size does not exceed 3/4 inch;
 - E) Water capacity of the unit does not exceed 6 U. S. gallons; and
 - F) Water temperature does not exceed 350~ F.
- 7) ISI pressure vessels which have a surveillance requirement in the plant technical specifications or are continuously monitored or are routinely subjected to examinations and tests (e.g., visual examinations and pressure tests), other than those required in this Part but that are determined by the Department to give an assurance of structural integrity at least equal to that provided by the examinations and test required by this Part.
- 8) Other boilers and pressure vessels listed under Section 5(a) of the Act.
- b) Boilers and pressure vessels listed under Section 5(b) of the Act shall be subject to the requirements of this Part (e.g., design, construction and registration) except for those requirements pertaining to inspection, Inspection Certificates and penalties for operating without a valid Inspection Certificate.

(Source: Amended at 20 Ill. Reg. 6455, effective April 26, 1996)

Section 505.60 Access to Facilities and Documents

Upon prior notice and subject to requirements contained in the Memorandum of Understanding, Subagreement No. 2, between the Department and the NRC, effective May 15, 1990, representatives of the Department or an Authorized Inspector may enter upon any privately or publicly owned property in

this State where a boiler or pressure vessel, including related appurtenances, or a part thereof is being designed, constructed, installed or used within or upon or in connection with a nuclear facility in this State to ascertain whether such boiler or pressure vessel or part thereof is designed, constructed, installed and inspected in accordance with the standards of this Part. In addition to the documents required by this Part, owners shall make available to the Department additional documents as the Department determines are required to verify ASME Code and National Board Inspection Code compliance in accordance with this Part. These documents may include, but need not be limited to, such documents as a Quality Assurance Program in effect at the nuclear facility meeting the requirements of the ASME Code, or the details of flaw evaluations. The requirements of this Section are subject to the limitations of Section 505.20(c).

AGENCY NOTE: Documentation required to be made available under this Section shall be relevant to a determination of compliance with this Part.

Section 505.70 Notification of Failures

- a) Any owner, which includes any person, firm, partnership, corporation or government entity, that knowingly fails to notify the Department within 24 hours, or the next business day, after a reportable event, or after any bodily injury or death to any person caused by a reportable event, is guilty of a Class B misdemeanor, if a natural person, or a business offense punishable by a fine of not less than \$501 and not more than \$10,000, if a corporation or government agency.
- b) In the case of a reportable event, the owner of the affected boiler or pressure vessel may take whatever measures it determines in its sole discretion are necessary to give emergency assistance to injured persons or to alleviate any threat to the public health and safety.
- c) In the case of a reportable event, the owner may not move, disturb or repair the affected boiler or pressure vessel until the Department has been given the opportunity to examine the boiler or pressure vessel within twelve hours after the reportable event, except that the owner may initiate an investigation, including the gathering of material for samples and the taking of any ancillary action necessary for such sample gathering, where the owner either determines that such activities will not substantially interfere with the Department's subsequent examination or provides a record of the initial circumstances sufficient to provide the Department with an accurate report of the condition which was obtained before the owner initiated its activities.
- d) The requirements of this Section shall apply to any boiler or pressure vessel including those exempt under Section 505.50.

Section 505.80 Administrative Review and Hearings - Inspection Certificates

This Section shall apply to all actions by the Department for noncompliance with this Part that potentially could impact upon the issuance, suspension or revocation of an Inspection Certificate required by this Part.

- a) When in any instance departmental review reveals that an owner may not be in compliance with one or more requirements of this Part, the Department will notify the owner in writing of those facts and circumstances known to the Department that give rise to the inference that the owner is not in compliance. If the facts and circumstances giving rise to the inference involve only boilers and pressure vessels that the NRC has determined are not within NRC's jurisdictional authority, subsection (c) of this Section shall apply and subsection (b) of this Section shall not apply. If the facts and circumstances giving rise to the inference involve any other boiler, pressure vessel or nuclear power system, subsection (b) of this Section shall apply and subsection (c) of this Section shall not apply.
- b) Simultaneously with the notification provided for in subsection (a) of this Section, the Department will notify the NRC in writing of those facts and circumstances known to the Department that give rise to the inference that the owner is not in compliance. If the owner fails to demonstrate to the Department that the owner is in compliance within 10 days after the notification, the Department shall provide to the NRC a written request pursuant to 10 CFR 2.200 et seq. (1995), that the NRC take appropriate action, e.g., pursuant to 10 CFR, Part 2, Appendix C (1995). The request will specify the NRC action or actions that the Department is requesting.
- c) If the owner fails to demonstrate to the Department that the owner is in compliance within 10 days after the notification provided for in subsection (a) of this Section, the Department shall issue a Preliminary Order and Notice of Opportunity for Hearing in accordance with 32 Ill. Adm. Code 200. The owner aggrieved by such order may within 15 days submit a written request for a hearing to the Department, which shall thereafter hold an adjudicatory hearing in accordance with Section 16 of the Boiler and Pressure Vessel Safety Act, the Illinois Administrative Procedure Act and 32 Ill. Adm. Code 200.
 - 1) If, after the hearing, the Director finds that the owner or organization was in compliance with the requirements of this Part, the Director shall issue to the owner an Order of Compliance or issue such other order as appropriate.
 - 2) If, after the hearing or default, the Director finds that the owner is not in compliance with the requirements of this Part, the Director will render a final decision which may include denying an application for, or suspending or revoking, an affected Inspection Certificate.

- d) All final administrative decisions of the Director under this Part shall be subject to judicial review pursuant to Section 16 of the Boiler and Pressure Vessel Safety Act.

(Source: Amended at 20 Ill. Reg. 6455, effective April 26, 1996)

Section 505.82 Administrative Review and Hearings - Authorized Inspection Agency

This Section shall apply to any action by the Department to deny an application for, or to suspend or revoke, departmental recognition of an Authorized Inspection Agency.

- a) An owner or organization aggrieved by the Department's action pursuant to Sections 505.190(c) or 505.190(e) may within 15 days submit a written request for a hearing to the Department, which shall thereafter hold an adjudicatory hearing in accordance with Section 16 of the Boiler and Pressure Vessel Safety Act, the Illinois Administrative Procedure Act and 32 Ill. Adm. Code 200.
 - 1) If, after the hearing, the Director finds that the owner or organization was in compliance with the requirements of this Part, the Director shall issue an order directing that recognition be extended to the organization.
 - 2) If, after the hearing or default, the Director finds that the owner or organization is not in compliance with the requirements of this Part, the Director will render a final decision which may include denying the application for recognition.
- b) All final administrative decisions of the Director under this Part shall be subject to judicial review pursuant to Section 16 of the Boiler and Pressure Vessel Safety Act.

Section 505.84 Administrative Review and Hearings - Special Permits

This Section shall apply to any action by the Department to deny an application for, or to suspend or revoke, a special permit for construction of a non-ASME Code boiler or pressure vessel pursuant to Section 505.2700 of this Part.

- a) An owner aggrieved by a Departmental denial pursuant to Section 505.2700(c)(5), (d)(5) and (e)(5) of this Part or departmental action pursuant to Section 505.2700(c)(4), (d)(5) and (e)(5) of this Part may within 15 days submit a written request for a hearing to the Department, which shall thereafter hold an adjudicatory hearing in accordance with Section 16 of the Boiler and Pressure Vessel Safety Act, the Illinois Administrative Procedure Act and 32 Ill. Adm. Code 200.
 - 1) If, after the hearing, the Director finds that the owner was in compliance with the requirements of this Part or that the affected non-ASME boiler or pressure vessel meets

the criteria of Section 505.2700(c) of this Part, the Director shall issue an order directing that the Special Permit be issued to the owner or organization.

- 2) If, after the hearing or default, the Director finds that the owner is not in compliance with the requirements of this Part, the Director will render a final decision which may include denying the application for, or suspending or revoking, a Special Permit.
- b) All final administrative decisions of the Director under this Part shall be subject to judicial review pursuant to Section 16 of the Boiler and Pressure Vessel Safety Act.

(Source: Amended at 20 Ill. Reg. 6455, effective April 26, 1996)

Section 505.86 Actions Pending Before the United States Nuclear Regulatory Commission

Whenever any person brings an action before the NRC pursuant to 10 CFR 2.200 et seq. (1991) alleging that a departmental application of a requirement of this Part could affect the safety or the operation of a nuclear facility, the Department shall not apply or enforce the requirement until such time as the NRC concurs in the application or enforcement or until the NRC otherwise finds and notifies the Department that the application of the requirement could not affect the safety or the operation of the nuclear facility.

Section 505.90 Address and Telephone Number for Notifications and Inquiries

Written reports or communications concerning or required by this Part shall be addressed to: Code Compliance Section, Office of Nuclear Facility Safety, Illinois Department of Nuclear Safety, 1035 Outer Park Drive, Springfield, Illinois 62704. The Department may be reached by telephone at (217) 785-9900.

Section 505.100 Standards for Design, Construction, Operation and Inspection (general)

Please refer to Section 505.1000 for ISI boilers and pressure vessels and Section 505.2000 for non-ISI boilers and pressure vessels.

Section 505.110 Registration Requirements (general)

- a) The requirements of this Section are subject to the limitations of Section 505.20(c) of this Part.
- b) The owner of a nuclear facility shall register with the Department all boilers and pressure vessels contained within or upon or in connection with the nuclear facility unless exempt under Section 505.50(a) of this Part, as follows:
 - 1) For each boiler and pressure vessel already in operation and registered with the Office of the State Fire Marshal on February 7, 1994, the owner shall submit on or before August 6,

1994 evidence supporting existing registration through the Office of the State Fire Marshal and the additional information required by Section 505.1100 or 505.2100 of this Part, as applicable. Such evidence shall include the State serial number assigned to the boiler or pressure vessel, a description of the boiler or pressure vessel and the nuclear power system to which the boiler or pressure vessel belongs.

- 2) For each boiler and pressure vessel already in operation and not registered with the Office of the State Fire Marshal on February 7, 1994, the owner shall submit on or before May 8, 1994 the information required by Section 505.1100 or 505.2100 of this Part, as applicable.
 - 3) For each boiler and pressure vessel installed after February 7, 1994, the owner shall register the boiler or pressure vessel prior to its operation in accordance with Section 505.1100 or 505.2100 of this Part, as applicable.
- c) After February 7, 1994, manufacturer's Data Reports shall be filed by the owner with the Department for new installation and reinstallation of boilers and pressure vessels at nuclear facilities unless otherwise exempted by Section 505.50(a) of this Part. If a boiler or pressure vessel is of special design or will not bear the ASME stamp, then the owner shall additionally comply with the requirements of Sections 505.170 and 505.1700 or Section 505.2700 of this Part for non-ASME Code ISI or non-ISI boilers and pressure vessels, respectively.
- AGENCY NOTE: Data Reports as used in this subsection (c) refers to those documents completed as required by the construction code applicable to the boiler or pressure vessel.
- d) Each boiler or pressure vessel subject to the Act shall be identified by a serial number of the State of Illinois. If a State serial number has not already been assigned by the OSFM, a number will be assigned by the Department and applied by the Authorized Inspector. Additionally, the ASME Code required stamping shall be kept free of paint and lagging so that it will be plainly visible and easily read by the Inspector.
 - e) The State serial number on boilers shall not be less than 5/16" in height and shall be preceded by the letters "ILL" which shall also be not less than 5/16" in height. The State serial number on unfired pressure vessels shall be not less than 5/16" in height and shall be preceded by the letters "ILL" and the letter "U" which shall also be not less than 5/16" in height. The Inspector shall make certain that the correct Illinois State serial number is affixed to the boiler or pressure vessel.
 - f) The requirements of subsections (d) and (e) of this Section for the physical application of the State serial number may be waived if a system to identify

the boiler or pressure vessel with the assigned State serial number has been established and the system of identification is acceptable to the Department. An alternative system for the identification of boilers and pressure vessels with assigned State serial numbers shall be acceptable to the Department if the alternative system readily and unambiguously allows the Department and Authorized Inspector to track the inspection status of the boilers and pressure vessels using the State serial numbers. Acceptable alternative systems of identification may include, but are not limited to, the use of cross-reference lists between assigned State serial numbers and any of the following: National Board serial numbers; manufacturers' names and serial numbers; or plant equipment identification numbers as shown on controlled plant system identification drawings provided to the Department.

- g) A Certificate Inspection shall be made of all used or second-hand boilers or pressure vessels prior to operation at a nuclear facility in this State. In a case where a boiler or pressure vessel is moved and reinstalled the fittings and appliances shall be upgraded to comply with the rules for new installations.

(Source: Amended at 20 Ill. Reg. 6455, effective April 26, 1996)

Section 505.120 Inspection Certificates (general)

- a) Inspection Certificates for nuclear power systems shall be issued in accordance with Section 505.1200. Inspection Certificates for non-ISI boilers and pressure vessels shall be issued in accordance with Section 505.2200. Both nuclear power systems and non-ISI boilers and pressure vessels and their Inspection Certificates shall be subject to the provisions of subsections (b) and (c) below.
- b) Owners shall keep the Inspection Certificate in an accessible location.
- c) Boilers and pressure vessels that change classification (i.e., to or from ISI or non-ISI) as a result of additions to or deletions from the Inservice Inspection Plan shall be subject to the registration and submittal requirements of the new classification. To reduce the administrative burden on the owner, the owner need only inform the Department of all previous submittals made on behalf of existing registration which the owner intends to apply to the new classification.

Section 505.130 Operation Requirements (general)

- a) The requirements of this Section are subject to the limitations of Section 505.20(c).
- b) Any person, firm, partnership or corporation violating any of the provisions of this Part shall be subject to the penalties provided in the Act.

- c) An Inspection Certificate may be suspended by the Department if an ISI or non-ISI boiler or pressure vessel or nuclear power system is in operation but not in compliance with this Part.
- d) An Inspection Certificate may be suspended by the Department if an ISI or non-ISI boiler or pressure vessel or nuclear power system is being operated in an unsafe condition.
- e) If the owner of any boiler or pressure vessel or nuclear power system required to be inspected refuses to allow an inspection to be made, the Department shall take action to suspend the Inspection Certificate under Section 505.80 until the owner complies with the requirements.
- f) For any boiler or pressure vessel that has been inspected and declared unsafe by an Authorized Inspector, the Authorized Inspector shall notify the Department of his intention to condemn the boiler or pressure vessel. The Department shall act in accordance with subsection (g) below for such ISI or non-ISI boilers or pressure vessels.
- g) Upon being notified under the provisions of subsection (f) above, the Department shall take action concerning the affected Inspection Certificate in accordance with Section 505.80.
- h) Subject to the limitations of Section 505.20(c), 505.80 and 505.86, the owner who causes a non-ISI boiler or pressure vessel or nuclear power system to be operated without a valid Inspection Certificate shall be subject to the penalty as provided in the Act.
- i) Removal of Safety Appliances.
 - 1) No person, except under the direction of an Authorized Inspector, shall attempt to remove or shall do any work upon safety appliances required by this Part while a boiler or pressure vessel is in operation. If any of these appliances are repaired during an outage of a boiler or pressure vessel, they shall be reinstalled and in proper working order before the object is again placed in service.
 - 2) No person shall in any manner load the safety valve or valves to maintain a working pressure in excess of that stated on the Inspection Certificate.

Section 505.140 Inspection Requirements (general)

- a) The requirements of this Section are subject to the limitations of Section 505.20(c).
- b) If, upon inspection and notification by an Authorized Inspector, a boiler or pressure vessel at a nuclear facility is found to be in such condition that it is unsafe to operate, the Department, subject to the limitations of Section 505.20(c), shall act to suspend the Inspection Certificate in accordance with Section 505.80.
- c) Owners shall assure that examinations and tests are conducted in accordance with the methods and frequencies established by this Part.

- d) In addition to the reporting frequencies specified in this Part, the owner shall report to the Department within 72 hours when, on the basis of observation or objective information, the owner has reason to believe that an ISI or non-ISI boiler or pressure vessel or nuclear power system does not meet the standards of this Part.
- e) Inspections shall be conducted by Authorized Inspectors.

Section 505.150 Repairs and Alterations (general)

Please refer to Section 505.1500 for ISI boilers and pressure vessels and Section 505.2500 for non-ISI boilers and pressure vessels.

Section 505.160 Code Case Applications (general)

The owner may, at his discretion, elect to use an ASME Code Case to design, construct, examine, test, repair or alter a boiler or pressure vessel. The owner shall notify the Department of all intentions to use a Code Case and the extent and nature of the use of the Code Case for the particular application.

Section 505.170 Use of Alternative Standards for Construction, Inspection and Repair (general)

- a) The Department may issue special permits for boilers and pressure vessels at nuclear facilities which for some reason were not constructed in accordance with the applicable ASME Code Section, or for some reason cannot be inspected or repaired in accordance with this Part. The Department shall issue special permits in accordance with Section 505.1700 or Section 505.2700 of this Part, as applicable.
- b) Owners may request the Department to issue a special permit for a boiler or pressure vessel not constructed in accordance with the applicable ASME Code Section.
- c) For boilers and pressure vessels using alternative standards for construction, upon completion of construction and installation, the owner shall register the non-ASME Code boiler or pressure vessel with the Department. The owner shall demonstrate compliance with the provisions of the special permit. The owner shall meet the applicable registration requirements for either ISI boilers and pressure vessels in Sections 505.1100 and 505.1200 of this Part or non-ISI boilers and pressure vessels in Sections 505.2100 and 505.2200 of this Part.

(Source: Amended at 20 Ill. Reg. 6455, effective April 26, 1996)

Section 505.180 Authorized Inspectors (general)

- a) To inspect ISI or non-ISI boilers or pressure vessels at nuclear facilities within the State an individual shall hold a Commission as a Special Inspector and an identifying commission card issued by the Office

of the State Fire Marshal as provided in Section 8 of the Act.

- b) If an Authorized Inspector finds that the boiler or pressure vessel or any of its appurtenances are in an unsafe condition the Inspector shall immediately notify the Department and submit a report of the defects.
- c) The requirements of this Section are subject to the limitations of Section 505.20(c).
- d) Authorized Inspectors shall perform all duties required of them under the ASME Code or the National Board Inspection Code, as applicable. Authorized Inspectors shall notify the Department within 7 days if they have knowledge of a nuclear power system or an ISI or non-ISI boiler or pressure vessel that:
 - 1) is being operated without a valid Inspection Certificate;
 - 2) is being operated at a pressure which exceeds indicated pressure on the Inspection Certificate; or
 - 3) otherwise deviates from the requirements of this Part.
- e) Inspectors inspecting ISI boilers or pressure vessels or nuclear power systems shall meet the requirements of Section 505.1800.

Section 505.190 Authorized Inspection Agencies (general)

- a) An organization that is providing ASME Code or National Board Inspection Code inspection services at a nuclear facility on February 7, 1994 shall be automatically recognized by the Department as an Authorized Inspection Agency. Such an organization shall, on or before March 9, 1994, notify the Department in writing that it is providing such inspection services. The notification shall also list the ASME Code Sections/National Board Inspection Code to which it conducts inspection activities.
- b) An organization that wishes to provide ASME Code or National Board Inspection Code inspection services at a nuclear facility but is not doing so as of February 7, 1994 shall be recognized as an Authorized Inspection Agency by the Department in accordance with subsection (c) below prior to providing ASME Code or National Board Inspection Code inspection services at a nuclear facility. Such an organization shall submit the following to the Department:
 - 1) A written request for recognition as an Authorized Inspection Agency;
 - 2) A list of the names of Authorized Inspectors employed; and
 - 3) A written description of the types of inspections that the organization will perform and the ASME Code Sections/ National Board Inspection Code for which it will conduct inspection activities.
- c) The Department shall, within 90 days after receipt of an organization's request submitted pursuant to

this Section, recognize the organization as an Authorized Inspection Agency upon determining that it has demonstrated in the request that it meets all qualification, duty and other requirements in those ASME Code Sections/National Board Inspection Code for which it wishes to provide inspection services. If it is determined that an organization's request submitted pursuant to this Section does not meet the requirements of this Section, the Department shall take action under Section 505.82.

AGENCY NOTE: Qualification, duty and other requirements for organizations in subsections (b) and (c) above shall be in accordance with the latest edition and addenda of the ASME Code/National Board Inspection Code referenced in Section 505.40.

- d) The Office of the State Fire Marshal of the State of Illinois is exempt from all the requirements of this Section.
- e) If the Department determines that an Authorized Inspection Agency is not qualified, the Department shall act to suspend or revoke its recognition of the Authorized Inspection Agency under Section 505.82.

AGENCY NOTE: Applicable ASME Code Sections/National Board Inspection Code as used in this Section means those under which the inspection agency is performing inspection activities. Departmental reviews will determine whether the organization meets all requirements for Authorized Inspection Agencies as found in the most recent edition and addenda of the ASME Code or National Board Inspection Code, as applicable, referenced in Section 505.40.

- f) Authorized Inspection Agencies that are writing boiler or pressure vessel risks on February 7, 1994 shall, on or before March 9, 1994, notify the Department of all such risks being written.
- g) Following the notification of subsection (f) above, Authorized Inspection Agencies shall notify the Department within 30 days of all new boiler or pressure vessel risks written.
- h) Within 30 days following each inspection required by this Part, the Authorized Inspection Agency shall submit an accurate report of the results of such inspection to the Department in accordance with this Part.

SUBPART B: ISI BOILERS AND PRESSURE VESSELS

Section 505.1000 Standards for Design, Construction, Operation and Inspection

ISI boilers and pressure vessels, including related appurtenances, except those exempt under Section 505.50(a), installed or operated within or upon or in connection with a nuclear facility in Illinois shall be designed, constructed, installed, stamped, examined, tested, repaired, altered and inspected in accordance with Sections III and XI of the ASME Code or with other codes and standards as reflected in the

facility's Operating License, Final Safety Analysis Report, technical specifications or other licensing documents as required or approved by the NRC.

Section 505.1100 Registration Requirements

For registration of each ISI boiler and pressure vessel, except those exempt under Section 505.50(a), the owner shall submit the following to the Department. If the submittal applies to a collection of ISI boilers and pressure vessels, the owner shall submit the documentation once for the ISI boilers and pressure vessels included in the submittal. If it is determined that any of the documents have previously been submitted to the Department or the Office of the State Fire Marshal, the owner does not have to resubmit them.

- a) A controlled copy of the Inservice Inspection Plans for the nuclear power system;
- b) Cross references to the State serial numbers, and National Board serial numbers if available, for all ISI boilers and pressure vessels in the Inservice Inspection Plan;
- c) For a nuclear power system that has not yet completed the first inspection period, preservice inspection summary reports for the nuclear power system;
- d) For ISI boilers and pressure vessels in operation on February 7, 1994:
 - 1) The Owner's Data Report, form NIS-1 of ASME Code Section XI, for inservice inspections conducted during the inservice inspection interval in effect on February 7, 1994;
 - 2) The Owner's Report for Repair or Replacement, form NIS-2 of ASME Code Section XI, if required by the applicable Code Edition and Addenda or Code Case used, for repair and replacement of ISI boilers and pressure vessels conducted during the inservice inspection interval in effect on February 7, 1994; and
 - 3) Inservice inspection summary reports for inservice inspections conducted during the inservice inspection interval in effect on February 7, 1994.
- e) For boilers and pressure vessels covered by this Section, owners shall meet the requirements of Section 505.110.

Section 505.1200 Inspection Certificates

This Section is not intended to be, in any way, inconsistent with the applicable regulations, rules and requirements of the NRC. If a requirement of this Section as applied in any situation is or would be inconsistent with the regulations, rules and requirements of the NRC, the requirements of this Section shall not be applied. The Department will take action in regard to an Inspection Certificate only in accordance with Section 505.80. The Department shall issue Inspection Certificates for nuclear power systems in accordance with this Section if the reports, programs and plans required to be submitted by Sections 505.110, 505.1100 and this Section are submitted in

accordance with the frequencies and standards specified therein and are in compliance with this Part.

- a) Owners of nuclear power systems already in operation on February 7, 1994 shall not operate such nuclear power systems after February 7, 1995 without a valid Inspection Certificate issued by the Department. Operation of such nuclear power systems beyond this one year grace period without a valid Inspection Certificate shall constitute noncompliance with this Part.
- b) Owners of nuclear power systems not yet in operation on February 7, 1994, shall, prior to operation of such nuclear power systems, have a valid Inspection Certificate issued by the Department for such nuclear power systems.
- c) The Department shall issue one Inspection Certificate for each nuclear power system at a nuclear facility. Unless suspended by the Department, the Inspection Certificate shall remain valid through the six month period following the end of the inservice inspection period for which such Certificate was issued, or as otherwise permitted by this Part.
- d) For nuclear power systems already in operation on February 7, 1994, the Department shall issue the initial Inspection Certificates for the remainder of the inservice inspection period in effect on February 7, 1994 based on determination by the Department that the submittal requirements of Section 505.1100 and this Section are met.
- e) For nuclear power systems not yet in operation on February 7, 1994, the Department shall issue the initial Inspection Certificates for the first inservice inspection period based on a Department determination that the submittal requirements of Section 505.1100 are met.
- f) An Inspection Certificate shall be issued for each nuclear power system at the nuclear facility for the succeeding inservice inspection period when the Department determines that:
 - 1) The examinations and tests required by the Inservice Inspection Plan during the preceding inservice inspection period were completed; and
 - 2) All related submittal requirements of this Part are met.

AGENCY NOTE: In order to determine whether the examinations and tests required by the Inservice Inspection Plan during the preceding inspection period were performed and completed, the Department will review the submittals required by this Section against the Inservice Inspection Plan and the applicable edition and addenda of the ASME Code Section XI. The above review and determination will be made separately for each nuclear power system. During this review the Department shall accept requests for relief from ASME Code Section XI requirements that have been approved by the NRC.

- g) The inservice inspection interval for the nuclear power system may be extended or reduced as

permitted by the applicable Code edition and addenda or that has been approved by the NRC. The owner shall notify the Department in writing of any such change in the inservice inspection interval. The Department may issue a new Inspection Certificate, or may adjust the term of the Inspection Certificate in effect for the applicable inservice inspection period.

- h) When the owner discovers that an ISI boiler or pressure vessel is not in compliance with this Part, the owner shall take measures to bring the ISI boiler or pressure vessel into compliance. Such measures may include, but are not limited to, repair or replacement of the ISI boiler or pressure vessel in accordance with Section 505.1500. In such cases, the owner shall notify the Department in accordance with Section 505.140. The owner shall submit information concerning the details of the noncompliance and the measures taken to bring the noncomplying ISI boiler or pressure vessel into compliance to the Department within 90 days following the completion of such corrective measures. Any replacement ISI boiler or pressure vessel shall meet the requirements of this Part for new boilers and pressure vessels and shall be registered by the owner with the Department in accordance with Section 505.1100. The Department shall review the information submitted regarding the noncompliance and the corrective measures taken and may issue a revised Inspection Certificate to reflect any change in nuclear power system composition.
- i) The owner shall submit the following:
 - 1) In addition to the information submitted under Section 505.1100, the owner shall submit the following to the Department within 90 days after completing an inservice inspection:
 - A) The inservice inspection summary report required by ASME Code Section XI;
 - B) The Owner's Data Report, form NIS-1 required by ASME Code Section XI;
 - C) The Owner's Report for Repairs or Replacements, form NIS-2 of Section XI, if required by the applicable Code Edition and Addenda or Code Case used, for all repairs and replacements performed since the last inservice inspection; and
 - D) Deviations from the Inservice Inspection Plan implemented during inservice inspections that impact upon compliance with this Part.
 - 2) The owner shall submit the Inservice Inspection Plan for the next inservice inspection interval to the Department prior to the end of each inservice inspection interval.
- j) If the Department finds that:
 - 1) The submittals in subsection (i) above have not been made or are incomplete; or

2) The examinations and tests required by the owner's Inservice Inspection Plan have not been performed or are incomplete; or

3) The owner has not met the requirements of subsection (h) above; or

4) The nuclear power system is not being inspected in accordance with this Part;

the Department shall take action under Section 505.80.

k) In addition to the above requirements, owners shall meet the requirements of Section 505.120.

Section 505.1300 Operation Requirements

ISI boilers and pressure vessels shall meet the requirements of Section 505.130.

Section 505.1400 Inspection Requirements

ISI boilers and pressure vessels shall meet the requirements of Section 505.140.

Section 505.1500 Repairs

Repairs of ISI boilers and pressure vessels and pressure relief valves associated with ISI boilers and pressure vessels, except boilers and pressure vessels and those pressure relief valves associated with boilers and pressure vessels that are exempt under Section 505.50(a), shall be made in accordance with this Section.

- a) ISI boilers and pressure vessels shall be repaired in accordance with the applicable repair and replacement requirements of Section XI of the ASME Code or other codes and standards as reflected in the facility's Operating License, Final Safety Analysis Report, technical specifications or other licensing documents as required or approved by the NRC.
- b) Pressure relief valves associated with ISI boilers and pressure vessels shall be repaired in accordance with the applicable repair and replacement requirements of Section XI of the ASME Code or other codes and standards as reflected in the facility's Operating License, Final Safety Analysis Report, technical specifications or other licensing documents as required or approved by the NRC.

Section 505.1600 Code Case Applications

- a) Approval to use an ASME Code Case for ISI boilers and pressure vessels is vested in the NRC. The Department shall accept all ASME Code Cases approved for use by the NRC.
- b) Owners shall meet the notification requirements of Section 505.160 in all cases involving the use of Code Cases for ISI boilers or pressure vessels.

Section 505.1700 Use of Alternative Standards for Construction, Inspection and Repair

- a) Approval to permit an owner to use alternative standards for construction, inspection or repair of an ISI boiler or pressure vessel is vested in the NRC. The Department shall accept alternative construction, inspection or repair standards that have been accepted by the NRC.
- b) Owners shall meet the requirements of Section 505.170 of this Part in all cases involving use of alternative standards for ISI boilers or pressure vessels.

(Source: Amended at 20 Ill. Reg. 6455, effective April 26, 1996)

Section 505.1800 Authorized Inspectors

In order to perform the duties of an Authorized Inspector for ISI boilers and pressure vessels or nuclear power systems at nuclear facilities within the State, the individual must, in addition to the requirements of Section 505.180, hold a current endorsement with either a nuclear ("N" or "S") or an inservice ("I" or "IS") designation, as appropriate, issued by the National Board. Specific endorsement and corresponding titles are as follows:

- a) Authorized Nuclear Inspector ("N" Endorsement);
- b) Authorized Nuclear Inspector Supervisor ("S" Endorsement);
- c) Authorized Nuclear Inservice Inspector ("I" Endorsement); or
- d) Authorized Nuclear Inservice Inspector Supervisor ("IS" Endorsement).

Section 505.1900 Authorized Inspection Agencies

- a) Organizations seeking to provide inspection services to the requirements of ASME Code Section III, Section XI or both, shall be subject to the requirements of this Section and Section 505.190.
- b) The request for recognition submitted in Section 505.190(b) shall also contain documentation demonstrating that the organization meets the ASME Code and ASME/ANSI N626 qualifications for Authorized Inspection Agencies for the scope of inspection activities, including the possession of a valid ASME Certificate of Accreditation.
- c) The Department shall act in accordance with Section 505.190(c) on all requests for recognition submitted in accordance with this Part.

SUBPART C: NON-ISI BOILERS AND PRESSURE VESSELS

Section 505.2000 Standards for Design, Construction, Operation and Inspection

Non-ISI boilers and pressure vessels, including related appurtenances, except those exempt under Section 505.50(a) of

this Part, operated within or upon or in connection with a nuclear facility in Illinois, shall be designed, constructed, installed, examined, tested, repaired, altered and inspected as required by this Section, except in those cases where NRC has jurisdiction, as determined by NRC. Where NRC has jurisdiction, the codes and standards reflected in the facility's Operating License, Final Safety Analysis Report, technical specifications or other licensing documents as required or approved by the NRC shall apply. For non-ISI boilers and pressure vessels over which NRC has no jurisdiction, as determined by NRC, the standards required by this Part apply. If the NRC determines that NRC has jurisdiction, but has not established standards, the Department may propose to NRC that these or other standards be applied to such boilers and pressure vessels in nuclear power plants in Illinois.

- a) All new, existing and reinstalled non-ISI boilers, including related appurtenances, shall be designed, constructed, installed, examined, tested, repaired and altered in accordance with the ASME Code or National Board Inspection Code, as applicable, and inspected in accordance with this Part. Where a non-ISI boiler is moved and reinstalled, the fittings and appliances of that boiler shall comply with this Part.
- b) All non-ISI pressure vessels installed and placed in operation after December 31, 1976 and all reinstalled non-ISI pressure vessels, including related appurtenances, shall be designed, constructed, installed, tested, examined, repaired and altered in accordance with the ASME Code or National Board Inspection Code, as applicable, and inspected in accordance with this Part. Where a non-ISI pressure vessel is moved and reinstalled, the fittings and appliances of that pressure vessel shall comply with this Part.
- c) Non-ISI pressure vessels and related appurtenances installed and placed in operation at nuclear facilities on or before December 31, 1976 shall be inspected in accordance with this Part and designed, constructed, installed, tested, repaired and altered, in accordance with the following requirements.
 - 1) The MAWP for standard pressure vessels shall be determined in accordance with the applicable provisions of the ASME Code under which they were constructed and stamped.
 - 2) MAWP for Non-standard Pressure Vessels
 - A) The MAWP of a non-standard pressure vessel subject to internal pressure shall be determined by the strength of the weakest course computed from the thickness of the plate, the tensile strength of the plate, the efficiency of the longitudinal joint, the inside diameter of the course and the factor of safety set by this Part, as permitted below.

$(TS \cdot t \cdot E) / (R \cdot FS) = \text{MAWP}$, in psig, where:

TS = ultimate tensile strength of shell plate, in psi.

When the tensile strength of steel plate is not known, it shall be taken as 55,000 psi for temperature not exceeding 650~ F.

t = minimum thickness of shell plate of weakest course, in inches.

E = efficiency of longitudinal joint, depending upon construction. Use the following values (in percents):

For Fusion-Welded and Brazed Joints:

Single lap welded40

Double lap welded.....60

Single butt welded.....60

Double butt welded.....75

Forge welded.....70

Brazed steel.....80

For riveted joints -- calculate riveted joint efficiency in accordance with rules given in Section I, Part PR, of the 1971 ASME Code.

R = inside radius for weakest shell course, in inches, provided the thickness does not exceed 10 percent of the radius. If the thickness is over 10 percent of the radius, the outer radius shall be used.

FS = factor of safety permitted shall be a minimum of 5.0.

- B) The MAWP for cylindrical non-standard pressure vessels subject to external or collapsing pressure shall be determined by the rules in Par. UG-27 and UG-28 of the ASME Code Section VIII.
- C) The minimum factor of safety may be increased when deemed necessary by the Inspector to assure the operation of the vessel within safe limits. The condition of the vessel and the particular service to which it is subject will be determining factors.
- D) The MAWP permitted for formed heads under pressure shall be determined by using the appropriate formulas from UG-32 or UG-33 of the ASME Code Section VIII and the tensile strength and efficiencies given above.
- d) All non-ISI boilers and pressure vessels shall be inspected in accordance with Chapter II of the National Board Inspection Code and this subsection (d). The following general requirements shall apply to all non-ISI boilers and pressure vessels.
 - 1) The owner shall prepare each boiler and pressure vessel for internal inspection in

accordance with Chapter II of the National Board Inspection Code. The Authorized Inspector should not enter any boiler or pressure vessel before he is satisfied that all necessary safety precautions from Chapter II of the National Board Inspection Code have been taken, including testing the boiler or pressure vessel atmosphere for oxygen and toxic, flammable and inert gases.

- 2) The owner shall prepare for and apply the hydrostatic test, whenever necessary, on a date agreeable to the owner and the Authorized Inspector.

- e) All cases not specifically covered by this Part shall be treated as new installations. Existing non-ISI boilers and pressure vessels shall be governed by current ASME Code and National Board Inspection Code requirements or the requirements of the ASME Code in effect at the time of construction.

(Source: Amended at 20 Ill. Reg. 6455, effective April 26, 1996)

Section 505.2100 Registration Requirements

For registration of each non-ISI boiler or pressure vessel, except those exempt under Section 505.50(a), the owner shall submit the following to the Department. If the submittal applies to a collection of non-ISI boilers and pressure vessels, the owner shall submit the documentation once for the non-ISI boilers and pressure vessels included in the submittal.

- a) For each non-ISI boiler and pressure vessel already registered with the Office of the State Fire Marshal on February 7, 1994, the owner shall submit the information required by Section 505.110.
- b) For each non-ISI boiler and pressure vessel registered after February 7, 1994, the owner shall submit any manufacturer's Data Reports related to the construction, repair, replacement or alteration of the non-ISI boiler or pressure vessel and its appurtenances.
- c) For boilers and pressure vessels covered by this Section, owners shall meet the requirements of Section 505.110.

AGENCY NOTE: Data Reports as used in subsections (a) and (b) above refers to those documents completed as required by the construction or inspection code applicable to the non-ISI boiler or pressure vessel.

Section 505.2200 Inspection Certificates

This Section is not intended to be, in any way, inconsistent with the applicable regulations, rules and requirements of the NRC. If a requirement of this Section as applied in any situation is or would be inconsistent with the regulations, rules and requirements of the NRC, the requirements of this Section shall not be applied. The Department will take action in regard to an Inspection Certificate only in accordance with Section 505.80 of this Part. The Department shall issue Inspection Certificates for non-ISI boilers and pressure vessels in accordance with this Section if the reports, inspection criteria

and plans required to be submitted by and identified in Sections 505.110 and 505.2100 of this Part and this Section are submitted in accordance with the frequencies specified therein and are in compliance with this Part.

a) The Department shall issue one Inspection Certificate to each non- ISI boiler and pressure vessel for a term equal to the frequency of inspection of the non-ISI boiler or pressure vessel as follows:

- 1) Power boilers, high pressure water boilers and high temperature water boilers shall be inspected annually, which shall be an internal inspection where conditions permit. Such boilers shall also be inspected externally annually while under representative operating conditions, if possible.
- 2) Low pressure steam boilers, hot water heating boilers and hot water supply boilers shall be inspected every two years. Such inspection shall be internal and external, where conditions permit. An external inspection shall be conducted under representative operating conditions at the request of the Authorized Inspector.
- 3) Pressure vessels subject to internal corrosion shall be inspected every three years. Such inspection shall be external and internal, where conditions permit.
- 4) Pressure vessels not subject to internal corrosion shall be inspected as follows:
 - A) Vessels containing incompressible fluids (e.g., water) shall be inspected externally every five years.
 - B) Vessels containing compressible fluids (e.g., air steam), or a combination of compressible and incompressible fluids, shall be inspected externally every three years.
 - C) Alternatively, the owner may submit an inspection plan for the vessel for its remaining life based upon refueling outages. The basis for such an inspection plan may include alternative examinations and tests performed, past performance of the pressure vessel and similar pressure vessels, status of the pressure vessel in the plant's maintenance program, the environment and contents of the pressure vessel and relevant engineering data.

AGENCY NOTE: External inspection may be waived by the Department due to inaccessibility of the equipment, based on the owner's detailed assessment of documentation and performance data verifying vessel integrity.

- 5) Inspection of flame safeguard equipment shall be to the standards of Section 505.40(c) of this Part and will be in conjunction with the regular inspection of boilers.

- 6) A grace period of 2 months beyond the period specified in subsection (a)(1) or (2) of this Section, may elapse between internal inspections of the boiler while it is not under pressure and the external inspection of the boiler while it is under pressure.

b) The Department shall issue an initial Inspection Certificate for a non-ISI boiler or pressure vessel as follows:

- 1) For non-ISI boilers and pressure vessels having a valid Inspection Certificate issued by the Office of the State Fire Marshal as of February 7, 1994, the Department shall automatically recognize such an Inspection Certificate until expiration or until the Department issues an Inspection Certificate in accordance with this Part, whichever is earlier. Application for an Inspection Certificate shall be in accordance with subsection (f) of this Section.
- 2) Owners of a non-ISI boiler or pressure vessel not yet in operation on February 7, 1994, shall, prior to operation of such a boiler or pressure vessel, have a valid Inspection Certificate issued by the Department in accordance with this Part. Application for an Inspection Certificate shall be in accordance with subsection (f) of this Section except that the owner shall submit the documents listed in (f)(2) of this Section at least 90 days prior to operating such a boiler or pressure vessel.
- 3) Owners of a non-ISI boiler or pressure vessel in operation on February 7, 1994 but not having a valid Inspection Certificate issued by the Office of the State Fire Marshal may not operate such a boiler or pressure vessel after August 6, 1994 without a valid Inspection Certificate issued by the Department in accordance with this Part. Requests for an Inspection Certificate shall be in accordance with subsection (f) of this Section except that:
 - A) The owner shall submit the documents listed in subsection (f)(2)(A) of this Section no later than 301 days prior to the end of the 180 day period.
 - B) The document submittals in subsection (f)(2)(B) of this Section shall be those documents, if any, completed within the 3 year period prior to February 7, 1994. The owner shall submit such documents on or before May 8, 1994.

c) For other than initial issuance of an Inspection Certificate in accordance with subsection (b) of this Section, the Department shall issue an Inspection Certificate for each non-ISI boiler or pressure vessel at the nuclear facility in accordance with this Section when the Department determines that:

- 1) The inspections applied to the non-ISI boiler or pressure vessel were completed;

- 2) The Report of Inspection or similar report form was completed for the non-ISI boiler or pressure vessel and was submitted to the Department in accordance with subsection (f)(2) of this Section; and
 - 3) All submittals in subsections (e) and (f) of this Section are met.
- d) The Department shall issue the Inspection Certificate within 90 days following receipt of the Report of Inspection on the non-ISI boiler or pressure vessel, or shall observe the procedures of subsection (g) of this Section. The latter shall occur either within 90 days following receipt of the Report of Inspection or within 10 days following the expiration date of the Inspection Certificate.
- e) The Inspection Certificate issued for the non-ISI boiler or pressure vessel as established by this Section may be extended for a maximum of one year.
- 1) For boilers, other than power boilers, high pressure water boilers, high temperature water boilers and for pressure vessels, the owner shall request permission from the Department to extend the term of the Inspection Certificate prior to implementing the extension. The Department shall review a request for extension and permit such extension where the extension does not increase the risk to the health and safety of the public and personnel.
 - 2) For power boilers, high pressure water boilers and high temperature water boilers, the Department may extend, for a time not exceeding one year, the time within which the power boiler is required to be internally inspected, subject to the following conditions and qualifications:
 - A) The analysis and treatment of feedwater for such power boilers shall be under the supervision of a person qualified in the field of water chemistry.
 - B) The analysis and treatment of the boiler feedwater shall be for the purpose of controlling and limiting serious deteriorating, crusting and sludge that affect the safety of the boiler.
 - C) The owner of such boilers shall maintain, for examination by the Inspector, accurate records of such chemical and physical laboratory analysis of samples of the boiler water taken at regular intervals of not more than 24 hours operation and of the treatment applied. These records shall specify dates and times of analyses, by whom analyzed, and the treatment applied at that time and shall be certified by the responsible authority. These records will adequately show the conditions of such water and any constituents or characteristics which are capable of producing corrosion or other deterioration of the boiler or its parts.
- D) Application for extension shall be in writing setting forth facts establishing compliance with the foregoing conditions and qualifications and shall be accompanied by the report of external inspection.
- f) Notwithstanding any other provision of this Section, an Inspection Certificate shall remain valid beyond the expiration date noted on the certificate until the boiler or pressure vessel is reinspected by the Authorized Inspector or until the certificate is suspended by the Department, provided that the owner of the boiler or pressure vessel makes it available for inspection at reasonable times. For each non-ISI boiler or pressure vessel, the owner shall submit the following:
- 1) The information required by Section 505.2100 of this Part;
 - 2) On or before the expiration date of the Inspection Certificate issued to the non-ISI boiler or pressure vessel:
 - A) The completed Report of Inspection or similar report form documenting that the inspections were performed in accordance with the inspection criteria and frequency requirements of subsection (a) of this Section and Section 505.2100 of this Part.
 - B) All Code Data Reports and all other information related to the repair, replacement or alteration of the non-ISI boiler or pressure vessel or its appurtenances performed since the last Certificate Inspection.
- g) If the Department finds that:
- 1) The submittals and notifications required by subsections (e) and (f) of this Section have not been made or are incomplete; or
 - 2) The inspections required by this Section have not been performed or are incomplete; or
 - 3) A change to the inspection frequency applied to the non-ISI boiler or pressure vessel is not in accordance with subsection (e) of this Section; or
 - 4) The non-ISI boiler or pressure vessel was insured and the insurance has been canceled or has otherwise become ineffective;
- the Department shall take action under Section 505.80 of this Part.
- h) In addition to the above requirements, owners shall meet the requirements of Section 505.120 of this Part.
- (Source: Amended at 20 Ill. Reg. 6455, effective April 26, 1996)

Section 505.2300 Operation Requirements

Non-ISI boilers and pressure vessels shall meet the requirements of Section 505.130.

Section 505.2400 Inspection Requirements

- a) If, upon an external inspection, there is evidence of a leak or crack, enough of the covering of the non-ISI boiler or pressure vessel shall be removed so that the Authorized Inspector may determine the condition of the non-ISI boiler or pressure vessel. If removing the covering could create a situation which could effect the operability or safety of the vessel, the limitations of Section 505.20(c) shall apply.
- b) Owners shall permanently maintain inspection data and supporting documents throughout the lifetime of the equipment.
- c) In addition to the above requirements, owners shall meet the requirements of Section 505.140.

Section 505.2500 Repairs and Alterations

Repairs and alterations of non-ISI boilers and pressure vessels, and pressure relief valves associated with non-ISI boilers and pressure vessels, except boilers and pressure vessels and those pressure relief valves associated with boilers and pressure vessels that are exempt under Section 505.50(a), shall be made in accordance with this Section. Non-ISI boilers and pressure vessels, and pressure relief valves associated with non-ISI boilers and pressure vessels, that are repaired or altered after February 7, 1994 shall be repaired or altered in accordance with this Section or other codes and standards as reflected in the facility's Operating License, Final Safety Analysis Report, technical specifications or other licensing documents as required or approved by the NRC. The requirements of this Section are subject to the limitations of Section 505.20(c).

- a) The requirements of this subsection are limited to welded repairs and welded and non-welded alterations of non-ISI boilers and pressure vessels. Where requirements for a repair or alteration are not given, it is intended that, subject to approval of the Authorized Inspector, details of design and construction, insofar as practical, will be consistent with the ASME Code for boilers and pressure vessels constructed to the ASME Code, or the code to which the item was originally constructed for boilers and pressure vessels not constructed to the ASME Code or the repair rules of the National Board Inspection Code.
 - 1) All non-ISI boilers and pressure vessels covered by the Act that are repaired after February 7, 1994 shall be repaired by one of the following organizations:
 - A) An owner and those organizations under contract to the owner, provided that:
 - i) such repairs are made in accordance with a Quality Assurance Program that meets

- the requirements of 10 CFR 50 Appendix B and has been approved by the NRC;
- ii) all portions of the owner's 10 CFR 50 Appendix B Quality Assurance Program, described in subsection (i) above, that are applicable to a repair activity are applied to the repair; and
- iii) the owner notifies the Department of his intention to apply 10 CFR 50 Appendix B Quality Assurance Program, described in subsection (i) above, to the repair of boilers and pressure vessels. This notification only needs to be given once for all repairs of boilers and pressure vessels performed under the owner's 10 CFR 50 Appendix B Quality Assurance Program at the nuclear facility.

AGENCY NOTE: The application of the owner's 10 CFR 50 Appendix B Quality Assurance Program, described in subsections above, is subject to review by the Authorized Inspector.

- B) An organization in possession of a valid "R" certificate of Authorization issued by the National Board.
 - C) An organization authorized by the Division of Boiler and Pressure Vessel Safety, Office of the State Fire Marshal, to repair boilers and pressure vessels.
- 2) Repairs shall be initiated only after they have been authorized by the Authorized Inspector who has reviewed and accepted the weld procedures, welders and welding operators' qualifications and repair methods. The Authorized Inspector may give prior approval for repairs of a routine nature. In every case the Authorized Inspector shall be advised of each repair under prior agreement.
 - 3) All non-ISI boilers and pressure vessels covered by the Act that are altered after February 7, 1994 shall be altered by one of the following organizations:
 - A) An owner and those organizations under contract to the owner, provided that:
 - i) such alterations are made in accordance with a Quality Assurance Program that meets the requirements of 10 CFR 50 Appendix B and has been approved by the NRC;
 - ii) all portions of the owner's 10 CFR 50 Appendix B Quality Assurance Program, described in subsection (a)(3)(A)(i) above,

that are applicable to an alteration activity are applied to the alteration; and

- iii) the owner notifies the Department of his intention to apply 10 CFR 50 Appendix B Quality Assurance Program, described in subsection (a)(3)(A)(i) above, to the alteration of boilers and pressure vessels. This notification only needs to be given once for all repairs of boilers and pressure vessels performed under the owner's 10 CFR 50 Appendix B Quality Assurance Program at the nuclear facility.

AGENCY NOTE: The application of the owner's 10 CFR 50 Appendix B Quality Assurance Program, described in subsections above, is subject to review by the Authorized Inspector.

- B) An organization in possession of a valid "R" Certificate of Authorization issued by the National Board, provided the alterations are within the scope of such authorization.
- 4) Alterations shall be initiated only after they have been authorized by the Authorized Inspector who has reviewed and accepted the alteration methods and calculations. If considered necessary, the Authorized Inspector shall make an inspection of the object before granting such authorization.
 - 5) Reports documenting repairs and alterations shall be sent to the Department in addition to the distribution required by the National Board Inspection Code.
 - A) Documentation of repairs shall be in accordance with Section R-402 of the National Board Inspection Code, except that, in lieu of a form R-1, an alternative form containing equivalent information may be used. All alternative forms shall be signed by the Authorized Inspector. All alternative forms shall be approved by the Department prior to use. The Authorized Inspector shall determine whether the completion of the form R-1 or alternative form is required for routine repairs.
 - B) Documentation of alterations shall be in accordance with Section R-502 of the National Board Inspection Code, except that, in lieu of a form R-1, an alternative form containing equivalent information may be used. All alternative forms shall be signed by the Authorized Inspector. All alternative

forms shall be approved by the Department prior to use.

- 6) Repairs and alterations shall be accepted by either an Authorized Inspector employed by the Authorized Inspection Agency responsible for the boiler or pressure vessel or by an Authorized Inspector employed by the Authorized Inspection Agency of record for the organization making the repair or alteration.
- 7) It shall be the responsibility of the organization making the repair or alteration to coordinate the acceptance inspection of the repair or alteration.
- 8) For pressure parts, the rules of Section R-307 of the National Board Inspection Code shall apply, except that references to Sections R-404 and R-505 in Section R-307 of the National Board Inspection Code shall be read as Sections 505.2500(a)(1) and 505.2500(a)(3).
- 9) Pressure Testing
 - A) The Authorized Inspector may require a pressure test after completing a repair to a boiler or pressure vessel when in the Authorized Inspector's judgment one should be conducted.
 - B) A pressure test in accordance with the National Board Inspection Code shall be applied to the boiler or pressure vessel on the completion of an alteration.
- 10) For repair methods, the rules of Section R-401 of the National Board Inspection Code shall apply.
- 11) Alteration methods shall comply with the general requirements of this subsection (a), and with the appropriate ASME Code Section or National Board Inspection Code, as applicable, including any service restrictions.
- 12) Major replacement of pressure parts, including drums and shells, which are fabricated by welding and for which a Manufacturers Data Report is required by the applicable ASME Code Section shall be fabricated by a manufacturer having an ASME Certificate of Authorization and the appropriate ASME Code Symbol Stamp. The item shall be inspected, stamped with the applicable ASME Code Symbol and the word "PART", and reported on the appropriate Manufacturers Partial Data Report.
- 13) When a repair or alteration requires removal of that part of a non-ISI boiler or pressure vessel containing the Code stamping, the Authorized Inspector shall, subject to the approval of the Department, witness the making of a facsimile of stamping, the obliteration of the old stamping and the transfer of the stamping to the new part. When the stamping is on a nameplate, the

Authorized Inspector is to witness the transfer of the nameplate to the new part. The ASME Code Symbol is not to be restamped.

- 14) For rerating, the rules of Section R-503 of the National Board Inspection Code shall apply except that "subject to acceptance" shall be read as "forwarded for review and approval". Additionally, the following shall apply:

- A) All requirements in Section R-503 of the National Board Inspection Code and this subsection shall be met to the satisfaction of the Authorized Inspection Agency at the location of the installation.
 - B) Revised calculations verifying the new service conditions shall be required from the original manufacturer or, when such calculations cannot be obtained from this source, they may be prepared by an Engineer in accordance with Section R-503(a) of the National Board Inspection Code.
 - C) The boiler or pressure vessel shall be pressure tested for the rerated condition as required by subsection (a)(8)(B) above.
- b) All ASME Code Section I "V" stamped, Section III "NV" stamped, and Section VIII "UV" stamped pressure relief valves associated with non-ISI boilers and pressure vessels shall be repaired in accordance with this subsection.
- I) All pressure relief valves covered by this subsection (b) that are repaired after February 7, 1994 shall be repaired by one of the following organizations:
- A) An owner and those organizations under contract to the owner, provided that:
 - i) such repairs are made in accordance with a Quality Assurance Program that meets the requirements of 10 CFR 50 Appendix B and has been approved by the NRC;
 - ii) all portions of the owner's 10 CFR 50 Appendix B Quality Assurance Program, described in subsection (b)(I)(A)(i) above, that are applicable to a repair activity are applied to the repair; and
 - iii) the owner notifies the Department of his intention to apply 10 CFR 50 Appendix B Quality Assurance Program, described in subsection (b)(I)(A)(i) above, to the repair of these pressure relief valves. This notification only needs to be given once for all repairs of boilers and pressure vessels

performed under the owner's 10 CFR 50 Appendix B Quality Assurance Program at the nuclear facility.

AGENCY NOTE: The application of the owner's 10 CFR 50 Appendix B Quality Assurance Program, described in subsections above, is subject to review by the Authorized Inspector.

- B) The manufacturer of the valve who is in possession of a valid ASME "V", "NV" or "UV" Certificate of Authorization, provided repairs are within the scope of the organization's Certificate of Authorization and are performed under the organization's Quality Control System or Quality Assurance System, as applicable.
 - C) An organization in possession of a valid "VR" Certificate of Authorization issued by the National Board, provided repairs are within the scope of the organization's Certificate of Authorization and are performed under the organization's Quality Control System.
 - D) An organization in possession of a valid Certificate of Authorization issued by the Division of Boiler and Pressure Vessel Safety, Office of the State Fire Marshal, to repair pressure relief valves provided repairs are within the scope of the organization's Certificate of Authorization and performed under the organization's accepted Quality Control System.
- 2) Repair of a pressure relief valve is considered to be the replacement or machining of any critical part, lapping of seat and disc or any other operation which may affect the flow passage, capacity, function or pressure retaining integrity. Disassembly and reassembly or adjustments which affect the pressure relief valve function are not considered a repair, but a test confirming the valve's set pressure shall be performed. The initial installation, testing and adjustments of a new pressure relief valve on a non-ISI boiler or pressure vessel are not considered a repair.
- 3) Nameplates
- A) The rules of Appendix C-VR, Section 9.0 of the National Board Inspection Code shall apply. The exceptions and clarifications of this subsection shall also apply.
 - B) The exception in National Board Inspection Code Appendix C-VR, Section 9.1, shall be as follows.

Individuals authorized by the Division of Boiler and Pressure Vessel Safety, Office of the State Fire Marshal, who are properly trained and qualified employees of the owner may make adjustments to the set pressure provided the adjusted settings and the date of the adjustment are recorded on a metal tag secured to the seal wire. All external adjustments shall be resealed showing the identification of the organization making the adjustments.

- C) For owners that act as the valve repair organization under the provisions of subsection (b)(1)(A) above who are not in possession of a valid "VR" Certificate of Authorization issued by the National Board, the requirements for stamping the ASME Code "V", "UV", "NV" or National Board "VR" mark in Section 9.0 of the National Board Inspection Code, Appendix C-VR shall not apply. All other requirements shall be met.
- 4) Performance Testing
 - A) The rules of Appendix C-VR, Section 11.0 of the National Board Inspection Code shall apply, regardless of whether the "VR" stamp will be or has been applied. The exceptions and clarifications of this subsection shall also apply.
 - B) The use of calibrated equipment per Section 8.2.1(M) of the National Board Inspection Code, Appendix C-VR, shall be met in Section 11.3(B)(2) of the National Board Inspection Code, Appendix C-VR.
- 5) Organizations that repair pressure relief valves under subsections (b)(1)(B) through (b)(1)(D) above may perform field repairs in accordance with the following requirements.
 - A) Qualified technicians in the employ of the repair organization perform such repairs.
 - B) Procedures that address field repairs are contained in the Quality Control System or Quality Assurance System, as applicable, and are maintained.
 - C) All functions affecting the quality of the repaired pressure relief valves are controlled from the location for which the appropriate authorization was issued.
 - D) Periodic audits of work carried out in the field are made by quality control personnel of the repair organization to ensure that the requirements of the Quality Control System or Quality Assurance System, as applicable, are met. This audit may include witnessing

the test of the field repaired pressure relief valve.

Section 505.2600 Code Case Applications

- a) The Department shall act on requests to use ASME Code Cases within 30 days after their receipt. The Department shall approve the use of a Code Case if such use is directly applicable to and consistent with the uses authorized by the ASME Code Case.
- b) The Department shall automatically approve the use of Code Cases to non-ISI boilers or pressure vessels in all cases where such use is approved by the NRC and referenced in the nuclear facility's Updated or Final Safety Analysis Report, technical specifications or other licensing documents. The Department shall not approve such use of Code Cases where the use is disapproved by the NRC.
- c) ASME Code Cases approved by the Department for a particular situation rather than for generic use shall be used only for that situation.

Section 505.2700 Use of Alternative Standards for Construction, Inspection and Repair

- a) For all non-ISI boilers and pressure vessels, the Department shall determine the acceptability of the alternative standards in accordance with this Section.
- b) The Department shall automatically accept alternative standards that have been accepted by the NRC and referenced in the nuclear facility's Updated or Final Safety Analysis Report, technical specifications or other licensing documents.
- c) For boilers and pressure vessels, other than those covered by subsection (b) of this Section, installed subsequent to February 7, 1994, to be constructed to alternative standards than the ASME Code standards, the owner may request the Department to issue a permit for the installation of a boiler or pressure vessel not constructed in accordance with the applicable ASME Code.
 - 1) The owner shall submit the documentation described in this Section to the Department and obtain a special installation permit.
 - 2) The owner shall specify the reasons why the boiler or pressure vessel cannot be constructed in accordance with ASME Code standards. The owner shall also supply the following information to the Department for review and consideration of requests for a special installation permit:
 - A) Full details of design and construction showing equivalency to and departures from the ASME Code, including blueprints and material showing details of the construction;
 - B) Data relating to the physical and chemical properties of all materials used in construction;

- C) Calculations showing how the MAWP was derived;
 - D) An authentic test record for all non-ASME Code materials used in construction; and
 - E) Other data as the owner deems relevant or as the Department may request in order to establish that the boiler or pressure vessel will be capable of operating as safely as one built to ASME Code standards.
- 3) The Department may issue special installation permits to a class of boilers or pressure vessels meeting the above criteria when it deems that the public interest would be best served by application of the class of boilers or pressure vessels rather than individual case-by-case determination.
- 4) The Department may, as a condition to issuance of a special installation permit, require the installation of safety features or prescribed operating procedures for boilers or pressure vessels. The Department will use relevant safety data in determining the need for installation of safety features or operating features.
- 5) If the Department denies a request for a special permit, the owner may request a hearing pursuant to Section 505.84 of this Part.
- d) For boilers and pressure vessels, other than those covered by subsection (b) of this Section, to be inspected to standards other than those specified in this Part, the owner shall request the use of alternative standards.
- 1) The owner shall submit the documentation described in this Section to the Department and obtain permission to use the alternative standards.
 - 2) The owner shall specify the reasons why the boiler or pressure vessel cannot be inspected in accordance with this Part.
 - 3) The Department may approve the use of alternative standards for inspection for a class of boilers or pressure vessels when it deems that the public interest would be best served by application of the class of boilers or pressure vessels rather than individual case-by-case determination.
 - 4) The Department may, as a condition of approval of the use of alternative standards for inspection, require the installation of safety features or prescribed operating procedures for boilers or pressure vessels. The Department will use relevant safety data in determining the need for installation of safety features or operating features.
 - 5) If the Department denies a request for the use of alternative standards for inspection, the owner may request a hearing pursuant to Section 505.84 of this Part.

- e) For boilers and pressure vessels, other than those covered by subsection (b) of this Section, to be repaired to standards other than those specified in this Part, the owner shall request the use of alternative standards.
 - 1) The owner shall submit the documentation described in this Section to the Department and obtain permission to use the alternative standards.
 - 2) The owner shall specify the reasons why the boiler or pressure vessel cannot be repaired in accordance with this Part.
 - 3) The Department may approve the use of alternative standards for repair for a class of boilers or pressure vessels when it deems that the public interest would be best served by application of the alternative standards to the class of boilers or pressure vessels rather than individual case-by-case determination.
 - 4) The Department may, as a condition of approval of the use of alternative standards for repair, require the installation of safety features or prescribed operating procedures for boilers or pressure vessels. The Department will use relevant safety data in determining the need for installation of safety features or operating features.
 - 5) If the Department denies a request for the use of alternative standards for repair, the owner may request a hearing pursuant to Section 505.84 of this Part.
- f) Owners shall meet the requirements of Section 505.170 of this Part in all cases involving use of alternative standards for non-ISI boilers or pressure vessels.

(Source: Amended at 20 Ill. Reg. 6455, effective April 26, 1996)

Section 505.2800 Authorized Inspectors

In order to perform the duties of an Authorized Inspector for non-ISI boilers or pressure vessels at nuclear facilities within the State, an individual shall meet the requirements of Section 505.180.

Section 505.2900 Authorized Inspection Agencies

- a) Authorized Inspection Agencies that are insuring a non-ISI boiler or pressure vessel shall immediately notify the Department when such insurance is canceled, not renewed, suspended or otherwise made ineffective because of unsafe conditions.
- b) Organizations seeking to provide inspection services to the requirements of the National Board Inspection Code or the ASME Code, except for Section III and Section XI, shall be subject to the requirements of Section 505.190.
- c) The request for recognition submitted in Section 505.190(b) shall also contain documentation demonstrating that the organization meets the

ASME Code or the National Board Inspection Code requirements for Authorized Inspection Agencies, if any, for the scope of inspection activities.

- d) Organizations that are providing inspection services at nuclear facilities on February 7, 1994 may be reviewed by the Department, after February 7, 1995. Such reviews shall be for the purpose of verifying that the organization is in compliance with applicable ASME Code Sections or National Board Inspection Code, as applicable, including qualification and duty requirements for Authorized Inspection Agencies contained therein.
- e) An organization that is recognized by the Department under Section 505.190(c) as an Authorized Inspection Agency may be reviewed by the Department either prior or subsequent to recognition. Such reviews shall be for the purpose of verifying that the organization is in compliance with applicable ASME Code Sections or National Board Inspection Code, as applicable, including qualification and duty requirements for Authorized Inspection Agencies contained therein.
- f) The Department shall give 15 days written notice before any reviews are performed under this Section. Reviews shall be performed at the locations where control of Authorized Inspectors occurs or at the organization's home office.

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER d: LOW LEVEL RADIOACTIVE
WASTE/TRANSPORTATION

PART 601
LICENSING REQUIREMENTS FOR LAND
DISPOSAL OF RADIOACTIVE WASTE

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AUTHORITY: Implementing and authorized by the Illinois Low-Level Radioactive Waste Management Act 420 ILCS 20

SOURCE: Adopted at 10 Ill. Reg. 17465, effective September 25, 1986; amended at 18 Ill. Reg. 16579, effective November 1, 1994; amended at 20 Ill. Reg. 6904, effective May 1, 1996.

Section 601.10 Purpose and Scope

- a) The regulations in this Part establish procedures, criteria, and terms and conditions upon which the Department of Nuclear Safety (Department) issues licenses for the land disposal of radioactive wastes if such disposal is away from the point of generation or if such disposal is of waste which has been received from other persons. Disposal of waste by an individual licensee is set forth in 32 Ill. Adm. Code 340. The requirements of this Part are in addition to, and not in substitution for, the requirements of 32 Ill. Adm. Code 310, 320, 330, 331, 340, 341, 350, 351, and 400.
- b) The regulations in this Part do not apply to disposal of licensed material as provided for in 32 Ill. Adm. Code 340.
- c) This Part contains procedural requirements and performance objectives applicable to any method of land disposal.

Section 601.20 Definitions

As used in this Part, the following definitions apply:

"Active maintenance" means activity which is needed during the period of institutional control to assure that the performance objectives in Sections 601.190 and 601.200 are met. Such active maintenance includes ongoing activities such as the pumping and treatment of water from a disposal unit or one-time measures such as replacement of a disposal unit cover. Active maintenance does not include custodial activities such as repair of fences, repair or replacement of monitoring equipment, revegetation, minor additions to soil cover, minor repair of disposal unit covers, and general disposal site upkeep such as mowing grass.

"Buffer zone" means a portion of the disposal site that is controlled by the licensee and that lies under the disposal units and between the disposal units and the boundary of the site.

"Chelating agent" means amine polycarboxylic acids, hydroxycarboxylic acids, glucinic acid and polycarboxylic acids.

"Commencement of construction" means any clearing of land, excavation, or other substantial action that would adversely affect the environment of a land disposal facility. The term does not mean disposal site exploration, necessary roads for

disposal site exploration, borings to determine foundation conditions, or other preconstruction monitoring or testing to establish background information related to the suitability of the disposal site or the protection of the environment.

"Custodial agency" means an agency of the government designated to act on behalf of the government owner of the disposal site.

"Disposal" means the isolation of radioactive wastes from the biosphere inhabited by persons and their food chains by emplacement in a land disposal facility.

"Disposal site" means that portion of a land disposal facility which is used for disposal of waste. It consists of disposal units and a buffer zone.

"Disposal unit" means a discrete portion of the disposal site into which waste is placed for disposal.

"Engineered barrier" means a man-made structure or device that is intended to improve the land disposal facility's ability to meet the performance objectives in this Part.

"Explosive material" means any chemical compound, mixture, or device which produces a substantial instantaneous release of gas and heat spontaneously or by contact with sparks or flame.

"Hazardous waste" means those wastes designated as hazardous by the U.S. Environmental Protection Agency regulations in 40 CFR 261, effective July 1, 1984.

"Hydrogeologic unit" means any soil or rock unit or zone which by virtue of its porosity or permeability, or lack thereof, has a distinct influence on the storage or movement of groundwater.

"Inadvertent intruder" means a person who might occupy the disposal site after closure and engage in normal activities, such as agriculture, dwelling construction, or other pursuits in which an individual might be unknowingly exposed to radiation from the waste.

"Intruder barrier" means a sufficient depth of cover over the waste that inhibits contact with waste and helps to ensure that radiation exposures to an inadvertent intruder will meet the performance objectives set forth in this Part, or engineered structures that provide equivalent protection to the inadvertent intruder.

"Land disposal" - see "Land disposal facility".

"Land disposal facility" means the land, buildings and structures and equipment which are intended to be used for the disposal of radioactive wastes.

"Monitoring" means observing and making measurements to provide data to evaluate the performance and characteristics of the disposal site.

"Pyrophoric liquid" means any liquid that ignites spontaneously in dry or moist air at or below 130~F (54.5~C). A pyrophoric solid is any solid material, other than one classed as an explosive, which under normal conditions is liable to cause fires through friction, retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious transportation, handling, or disposal hazard. Included are spontaneously combustible and water-reactive materials.

"Site closure and stabilization" means those actions that are taken upon completion of operations that prepare the disposal site for custodial care and that assure that the disposal site will remain stable and will not need ongoing active maintenance.

"Stability" means structural stability.

"Surveillance" means monitoring and observation of the disposal site for purposes of visual detection of need for maintenance, custodial care, evidence of intrusion, and compliance with other license and regulatory requirements.

"Waste" means those low-level radioactive wastes that are acceptable for disposal in a land disposal facility. For the purposes of this definition, low-level waste has the same meaning as in the Low-Level Radioactive Waste Policy Act (P.L. 96-573, as amended by P.L. 99-240, effective January 15, 1986), i.e., radioactive material that (A) is not high-level radioactive waste, spent nuclear fuel, or byproduct material (as defined in section 11 e.(2) of the Atomic Energy Act of 1954 (42 U.S.C. 2014(e)(2))); and (B) the Nuclear Regulatory Commission, consistent with existing law and in accordance with (A) above, classifies as low-level radioactive waste.

AGENCY NOTE: The reference to byproduct material as used in this definition has the same meaning as contained in Section 2014(e)(2) of the Atomic Energy Act, also referred to by its former designation of Section 11e.(2) of the Atomic Energy Act.

(Source: Amended at 20 Ill. Reg. 6904, effective May 1, 1996)

Section 601.30 License Required

- a) No person may receive, possess, and dispose of waste received from other persons at a land disposal facility unless authorized by a license issued by the Department pursuant to this Part and 32 Ill. Adm. Code 330.

- b) Each person shall file an application with the Department pursuant to

Part before commencing construction of a land disposal facility. Failure to comply with this requirement shall be grounds for denial of a license.

Section 601.50 Content of Application

In addition to the requirements set forth in 32 Ill. Adm. Code 330.250, an application for a license to receive from others, possess, and dispose of wastes shall consist of general information, specific technical information, institutional information, and financial information as set forth in Sections 601.60 through 601.100.

Section 601.60 General Information

The general information shall include each of the following:

- a) Identity and qualifications of the applicant including:
 - 1) The full name, address, telephone number and description of the business or occupation of the applicant;
 - 2) If the applicant is a partnership, the name and address of each partner and the principal location where the partnership does business;
 - 3) If the applicant is a corporation or an unincorporated association:
 - A) the state where it is incorporated or organized and the principal location where it does business; and
 - B) the names and addresses of its directors and principal officers;
 - 4) The organizational structure of the applicant, both offsite and onsite, including a description of lines of authority and assignments of responsibilities, whether in the form of administrative directives, contract provisions, or otherwise;
 - 5) The technical qualifications, including training and experience, of the applicant and members of the applicant's staff to engage in the proposed activities. Minimum training and experience requirements for personnel filling key positions described in Section 601.60(a)(5) must be provided;
 - 6) A description of the applicant's personnel training program;
 - 7) The plan to maintain an adequate complement of trained personnel to carry out waste receipt, handling, and disposal operations in a safe manner; and
 - 8) If the applicant is acting as an agent or representative of another person in filing the

application, all information required under this Section must be supplied with respect to the other person.

- b) A description of:
 - 1) The location of the proposed disposal site;
 - 2) The general character of the proposed handling, storage, treatment, and/or disposal activities;
 - 3) The types and quantities of radioactive waste to be received, possessed, and disposed of;
 - 4) Plans for use of the land disposal facility for purposes other than disposal of radioactive wastes; and
 - 5) The proposed facilities and equipment.
- c) Proposed schedules for construction, receipt of waste, and first emplacement of waste at the proposed land disposal facility.

Section 601.70 Specific Technical Information

Specific technical information pertaining to site suitability shall be provided to demonstrate that the performance objectives and the applicable technical requirements of this Part will be met:

- a) A description of the natural and demographic disposal site characteristics as determined by disposal site selection and characterization activities. The description shall include geologic, geotechnical, hydrologic, meteorologic, climatologic, and biotic features of the disposal site and vicinity.
- b) A description of the design features of the land disposal facility and the disposal units. The description shall include design features related to infiltration of water; integrity of covers for disposal units; structural stability of filling material, wastes, and covers; contact of wastes with standing water; disposal site drainage; disposal site closure and stabilization; elimination to the extent practicable of long-term disposal site maintenance; inadvertent intrusion; occupational exposures; disposal site monitoring; and adequacy of the size of the buffer zone for monitoring and potential mitigative measures.
- c) An environmental assessment describing the impacts that the disposal site will have on the environment.
- d) A description of the principal design criteria and their relationship to the performance objectives.
- e) A description of the design basis natural events or phenomena and their relationship to the principal design criteria.
- f) A description of codes and standards which the applicant has applied to the design and which will apply to construction of the land disposal facilities. Such standards shall meet local, state and national building code standards.
- g) A description of the construction and operation of the land disposal facility. The description shall include as a minimum the methods of construction of disposal units; waste emplacement; the procedures for and areas of waste segregation; types

of intruder barriers; onsite traffic and drainage systems; survey control program; methods and areas of waste storage; and methods to control surface water and groundwater access to the wastes. The description shall also include a description of the methods to be employed in the handling and disposal of wastes containing chelating agents or other nonradiological substances that might affect meeting the performance objectives of this Part.

- h) A description of the disposal site closure plan, including those design features which are intended to facilitate disposal site closure and to eliminate the need for ongoing active maintenance.
- i) An identification of the known natural resources at the disposal site whose exploitation could result in inadvertent intrusion into the low-level wastes after removal of active institutional control.
- j) A description of the kind, amount, classification, and specifications of the radioactive material proposed to be received, possessed, and disposed of at the land disposal facility.
- k) A description of the quality assurance program, tailored to low-level radioactive waste (LLW) disposal for the determination of natural disposal site characteristics and for quality control during the design, construction, operation, and closure of the land disposal facility and the receipt, handling, and emplacement of waste. Audits and managerial controls must be included.
- l) A description of the radiation safety program for control and monitoring of radioactive effluents to ensure compliance with the performance objective in Section 601.190 and occupational radiation exposure to ensure compliance with the requirements of 32 Ill. Adm. Code 340 and to control contamination of personnel, vehicles, equipment, buildings, and the disposal site. Both routine operations and accidents shall be addressed. The program description must include procedures, instrumentation, facilities, and equipment.
- m) A description of the environmental monitoring program including the frequency, type, and method of analysis to provide data to evaluate potential health and environmental impacts and the plan for taking corrective measures if migration of radionuclides is indicated.
- n) A description of the administrative procedures that the applicant will apply to control activities at the land disposal facility.

(Source: Amended at 20 Ill. Reg. 6904, effective May 1, 1996)

Section 601.80 Technical Analyses

The specific technical information shall also include the following analyses needed to demonstrate that the performance objectives of this Part will be met:

- a) Pathways analyzed in demonstrating protection of the general population from releases of radioactivity shall include air, soil, groundwater, surface water,

plant uptake, and exhumation by burrowing animals. The analyses shall clearly identify and differentiate between the roles performed by the natural disposal site characteristics and design features in isolating and segregating the wastes. The analyses shall assure that the exposures to humans from the release of radioactivity will not exceed the limits set forth in Section 601.190.

- b) Analyses of the protection of individuals from inadvertent intrusion will establish that the waste classification and segregation requirements will be met and that barriers to inadvertent intrusion will be provided.
- c) Analyses of the protection of individuals during operations shall include assessments of expected exposures due to routine operations and potential accidents during handling, storage, and disposal of waste. The analyses shall assure that exposures will be controlled to meet the requirements of 32 Ill. Adm. Code 340.
- d) Analyses of the long-term stability of the disposal site and the need for ongoing active maintenance after closure shall be based upon analyses of active natural processes such as erosion, mass wasting, slope failure, settlement of wastes and backfill, infiltration through covers over disposal areas and adjacent soils, and surface drainage of the disposal site. The analyses shall assure that there will not be a need for ongoing active maintenance of the disposal site following closure.

Section 601.90 Institutional Information

The institutional information submitted by the applicant shall include:

- a) A certification by the Federal or State agency which owns the land that the Department is prepared to accept transfer of the license when the provisions of Section 601.160 are met, and will assume responsibility for custodial care after site closure and post-closure observation and maintenance.
- b) Where the proposed disposal site is on land not owned by the Federal or State government, the applicant shall submit evidence that arrangements have been made for assumption of ownership in fee simple absolute by the Department before the Department issues a license.

Section 601.100 Financial Information

The financial information shall demonstrate that the financial qualifications of the applicant are adequate to carry out the activities for which the license is sought and meet all other financial requirements of this Part.

Section 601.110 Standards for Issuance of a License

A license for the receipt, possession, and disposal of waste containing or contaminated with radioactive material will be issued by the Department upon finding that:

- a) The issuance of the license will not constitute an unreasonable risk to the health and safety of the public;
- b) The applicant is qualified by reason of training and experience to carry out the disposal operations requested in a manner that protects health and minimizes danger to life or property;
- c) The applicant's proposed disposal site, disposal design, land disposal facility operations, including equipment, facilities, and procedures, disposal site closure, and post-closure institutional care will protect the public health and safety in that they provide assurance that the general population will be protected from releases of radioactivity including protection from releases in the public water supply in accordance with the performance objective in Section 601.190;
- d) The applicant's proposed disposal site, disposal site design, land disposal facility operations, including equipment, facilities, and procedures, disposal site closure, and post-closure institutional control will protect the public health and safety in that they will provide assurance that inadvertent intruders are protected in accordance with the performance objective in Section 601.200;
- e) The applicant's proposed land disposal facility operations, including equipment, facilities, and procedures, will protect the public health and safety in that they will provide assurance that the standards for radiation protection set out in 32 Ill. Adm. Code 340 will be met;
- f) The applicant's proposed disposal site, disposal site design, land disposal facility operations, disposal site closure, and post-closure institutional control will protect the public health and safety in that they will provide assurance that long-term stability of the disposed waste and the disposal site will be achieved and will eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure;
- g) The applicant's demonstration provides assurance that the applicable technical requirements of this Part will be met;
- h) The applicant's proposal for institutional control shall assure that such control will be provided for the length of time found necessary to ensure the findings in Section 601.110(c) through (f) and that the institutional control meets the requirements of Section 601.280; and
- i) The information on financial assurances meets the requirements of Section 601.310.

Section 601.120 Conditions of Licenses

- a) A license issued under this Part, or any right thereunder, may not be transferred, assigned, or in any manner disposed of, either voluntarily or involuntarily, directly or indirectly, through transfer of control of the license to any person, unless the Department finds, after securing full information, that the transfer is in accordance with the provisions

of the Radiation Protection Act (Ill. Rev. Stat. 1985, ch. 111 1/2, pars. 211 et seq.), the Illinois Low-Level Radioactive Waste Management Act (Ill. Rev. Stat. 1985, ch. 111 1/2, pars. 241 et seq.) and this Part and gives its consent in writing in the form of a license amendment.

- b) The Department shall have the authority to suspend or revoke a license at any time before the termination of a license. Such action shall only be taken after written notice has been given to the licensee and a hearing has been held in accordance with 32 Ill. Adm. Code 200, except that in the event of an immediate threat to health or safety, the Department may take immediate action pending a final determination in a hearing.
- c) No license may be terminated unless the final closure plan is fully implemented as approved by the Department, including post-closure observation and maintenance in accordance with this Part.
- d) The terms and conditions of the license are subject to amendment, revision, or modification, by reason of amendments to, or by reason of rules, regulations, and orders issued in accordance with the terms of the Radiation Protection Act and the Illinois Low-Level Radioactive Waste Management Act.
- e) Each person licensed by the Department pursuant to the regulations in this Part shall confine possession and use of radioactive materials to the locations and purposes authorized in the license.
- f) The licensee shall not dispose of waste until the licensee has received written notification from the Department that the Department has inspected the land disposal facility and has found it to be in conformance with the description, design, and construction described in the application for a license.
- g) The Department may incorporate in any license at the time of issuance, or thereafter, by appropriate rule, regulation or order, additional requirements and conditions with respect to the licensee's receipt, possession, and disposal of waste as it deems appropriate or necessary in order to:
 - 1) Protect health or to minimize danger to life or property;
 - 2) Require reports and the keeping of records, and to provide for inspections of activities under the license that may be necessary or appropriate to effectuate the purposes of the Radiation Protection Act, the Illinois Low-Level Radioactive Waste Management Act and regulations issued thereunder.
- h) The authority to dispose of wastes expires on the date stated in the license. Any expiration date on a license applies only to the site operations activities and to the authority to dispose of waste. Failure to renew the license shall not relieve the licensee of responsibility for carrying out site closure and post-closure observation and transfer of the license to the site owner.

Section 601.130 Application for Renewal or Closure

- a) An application for renewal or an application for closure under Section 601.140 must be filed at least 90 days prior to license expiration.
- b) Applications for renewal of a license must be filed in accordance with Sections 601.50 through 601.100. Applications for closure must be filed in accordance with Section 601.140. Information contained in previous applications, statements or reports filed with the Department under the license may be incorporated by reference if the references are clear and specific.
- c) In any case in which a licensee has filed an application in proper form for renewal of a license, the license does not expire until the Department has taken final action on the application for renewal.
- d) In determining whether a license will be renewed, the Department will apply the criteria set forth in Section 601.110.

Section 601.140 Contents of Application for Closure

- a) Prior to final closure of the disposal site, the applicant shall submit an application to amend the license for final closure. This final closure application shall include a final revision and specific details of the disposal site final closure plan included as part of the license application submitted under Section 601.70(g) that includes each of the following:
 - 1) Any additional geologic, hydrologic, or other data pertinent to the long-term containment of emplaced wastes obtained during the operational period.
 - 2) The results of tests, experiments, or any other analyses relating to filling material or excavated areas, final closure and sealing, waste migration and interaction with emplacement media, or any other tests, experiments, or analysis pertinent to the long-term containment of emplaced waste within the disposal site.
 - 3) Any proposed revision of plans for:
 - A) Decontamination and/or dismantlement of surface facilities;
 - B) Backfilling of excavated areas; or
 - C) Stabilization of the disposal site for post-closure care.
 - 4) Any new information regarding the environmental impact of final closure activities and long-term performance of the disposal site.
- b) Upon review and consideration of an application to amend the license for final closure submitted in accordance with Section 601.140(a), the Department shall issue an amendment authorizing final closure if the licensee provides assurance that the long-term performance objectives of Sections 601.180, 190, 200, 210 and 220 will be met.

Section 601.150 Post-Closure Observation and Maintenance

The licensee shall observe, monitor, and carry out maintenance and repairs at the disposal site until the site closure is complete and the license is transferred by the Department in accordance with Section 601.160. Responsibility for the disposal site must be maintained by the licensee for five (5) years. A longer time period for post-closure observation and maintenance may be required as part of the site closure plan, based upon site-specific conditions.

Section 601.160 Post-Closure Procedures

Following closure and the period of post-closure observation and maintenance, the licensee may apply for an amendment to transfer the custody of the disposal site to the appropriate State or Federal agency. Permission for such transfer shall be contingent upon a finding by the Department:

- a) That the closure of the disposal site has been made in conformance with the licensee's disposal site closure plan, as amended and approved as part of the license;
- b) That the performance objectives of this Part are met;
- c) That any funds and necessary records for care will be transferred to the State or Federal agency which will assume ownership of the disposal site;
- d) That the post-closure monitoring program is operational for implementation by the State or Federal agency which will assume responsibility for institutional control of the disposal site; and
- e) That the Federal or State agency which will assume responsibility for institutional control of the disposal site is prepared to assume responsibility and ensure that the institutional requirements found necessary under Section 601.110(h) will be met.

Section 601.170 Termination of License

- a) Following the period of institutional control required in accordance with Section 601.150 and upon establishing that the requirements of Section 601.110 have been met, the licensee may apply for an amendment to terminate the license.
- b) This application will be reviewed in accordance with the provisions of this Part and 32 Ill. Adm. Code 330.250.
- c) A license will be terminated only if the Department finds:
 - 1) That the requirements of 32 Ill. Adm. Code 330.250 and this Part have been met;
 - 2) That the institutional control requirements under Section 601.110(h) have been met; and
 - 3) That any additional requirements resulting from new information developed during the institutional control period have been met and that permanent monuments or markers warning against intrusion have been installed.

Section 601.180 Performance Objectives - General Requirement

Land disposal facilities shall be sited, designed, operated, closed, and controlled after closure to assure that exposures to individuals are within the limits established in the performance objectives in Sections 601.190 through 601.220.

Section 601.190 Performance Objectives - Protection of the General Population from Releases of Radioactivity

Concentrations of radioactive material which may be released to the general environment in ground water, surface water, air, soil, plants, or animals must not result in an annual dose exceeding an equivalent of 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public. The licensee shall assume initiatives which are necessary to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable.

Section 601.200 Performance Objectives - Protection of Individuals from Inadvertent Intrusion

Design, operation, and closure of the land disposal facility shall ensure protection of any individual inadvertently intruding into the disposal site and occupying the site or contacting the waste at any time after active institutional controls over the disposal site are removed.

Section 601.210 Performance Objectives - Protection of Individuals During Operations

Operations at the land disposal facility shall be conducted in compliance with the standards for radiation protection set out in 32 Ill. Adm. Code 340, except for releases of radioactivity in effluents from the land disposal facility, which shall be governed by Section 601.190. The licensee shall assume initiatives which are necessary to maintain radiation exposures as low as is reasonably achievable.

Section 601.220 Performance Objectives - Stability of the Disposal Site After Closure

The disposal facility shall be sited, designed, used, operated, and closed to achieve long-term stability of the disposal site and to eliminate, to the extent practicable, the need for ongoing active maintenance of the disposal site following closure so that only surveillance, monitoring, or minor custodial care is required.

Section 601.230 Technical Requirements - Disposal Site Suitability Requirements for Land Disposal

The following minimum characteristics shall be used in determining a site acceptable for use as a disposal facility:

- a) The primary emphasis in disposal site suitability is isolation of wastes, and the disposal site features that ensure that the long-term performance objectives are met.

- b) The disposal site shall be capable of being characterized, modeled, analyzed and monitored.
- c) Within the region where the facility is to be located, a disposal site shall be selected so that projected population growth and future developments are not likely to affect the ability of the disposal facility to meet the performance objectives of this Part.
- d) Areas shall be avoided having known natural resources which, if exploited, would result in failure to meet the performance objectives of this Part.
- e) The disposal site shall be generally well drained and free of areas of standing water or flooding or frequent ponding. Waste disposal shall not take place in a 100-year flood plain, as defined in the rules of the Illinois Department of Transportation, 92 Ill. Adm. Code 706, Subpart C.
- f) Upstream drainage areas shall be minimized to decrease the amount of runoff which could erode or inundate waste disposal units.
- g) The disposal site shall provide sufficient depth to the water table that ground water intrusion, perennial or otherwise, into the waste will not occur. The Department will consider an exception to this requirement to allow disposal below the water table if it can be conclusively shown that disposal site characteristics will result in molecular diffusion being the predominant means of radionuclide movement and the rate of movement will result in the performance objectives being met. In no case will waste disposal be permitted in the zone of fluctuation of the water table.
- h) The hydrogeologic unit used for disposal shall not discharge ground water to the surface within the disposal site.
- i) Areas shall be avoided where tectonic processes such as faulting, folding, seismic activity or vulcanism occur with such frequency and to such an extent that they would affect the ability of the disposal site to meet the performance objectives of this Part or would preclude defensible modeling and prediction of long-term impacts.
- j) Areas shall be avoided where surface geologic processes such as mass wasting, erosion, slumping, landsliding, or weathering occur with such frequency and to such an extent that they would affect the ability of the disposal site to meet the performance objectives of this Part, or would preclude defensible modeling and prediction of long-term impacts.
- k) The disposal site must not be located where nearby facilities or activities could adversely impact the ability of the site to meet the performance objectives of this Part or significantly mask the environmental monitoring program.

(Source: Amended at 18 Ill. Reg. 16579, effective November 1, 1994)

Section 601.240 Technical Requirements - Disposal Site Design for Land Disposal

- a) Site design features shall be directed toward long-term isolation and avoidance of the need for continuing active maintenance after site closure.
- b) The disposal site design and operation shall be compatible with the disposal site closure and stabilization plan and lead to disposal site closure that assures that the performance objectives will be met.
- c) The disposal site shall be designed to complement and improve, where appropriate, the ability of the disposal site's natural characteristics to assure that the performance objectives will be met.
- d) Covers shall be designed to minimize to the extent practicable water infiltration, to direct percolating or surface water away from the disposed waste, and to resist degradation by surface geologic processes and biotic activity.
- e) Surface features shall direct surface water drainage away from disposal units at velocities and gradients which will not result in erosion that will require ongoing active maintenance in the future.
- f) The disposal site shall be designed to minimize to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal.

Section 601.250 Technical Requirements - Land Disposal Facility Operation and Disposal Site Closure

- a) Wastes designated as Class A pursuant to 32 Ill. Adm. Code 340.3070 shall be segregated from other wastes by placing in disposal units which are sufficiently separated from disposal units for the other waste classes so that any interaction between Class A wastes and other wastes will not result in the failure to meet the performance objectives of this Part. This segregation is not necessary for Class A wastes if they meet the stability requirements in 32 Ill. Adm. Code 340.3080(b).
- b) Wastes designated as Class C pursuant to 32 Ill. Adm. Code 340.3070 shall be disposed of so that the waste is protected by a barrier of a minimum of 5 meters or must be disposed of with intruder barriers that are designed to protect against an inadvertent intrusion for at least 500 years.
- c) Except as provided in subsection (l) only waste classified as Class A, B, or C shall be acceptable for disposal. All waste shall be disposed of in accordance with requirements of subsections (d) through (k).
- d) Wastes shall be emplaced in a manner that maintains the package integrity during emplacement, minimizes the void spaces between packages, and permits the void spaces to be filled.

- e) Void spaces between waste packages shall be filled with earth or other material to reduce future subsidence.
- f) Waste shall be placed and covered in a manner that limits the radiation dose rate at the surface of the cover to levels which at a minimum will permit the licensee to comply with all provisions of 32 Ill. Adm. Code 340.1050 at the time the disposal facility is transferred to the custody of a State or Federal agency pursuant to Section 601.160.
- g) The boundaries and locations of each disposal unit shall be accurately located and mapped by means of a land survey. Disposal units shall be marked in such a way that the boundaries of each unit can be easily defined. Three permanent survey marker control points, referenced to United States Geological Survey (USGS) or National Geodetic Survey (NGS) survey control stations, shall be established on the site to facilitate surveys. The USGS or NGS control stations shall provide horizontal and vertical controls as checked against USGS or NGS record files.
- h) A buffer zone of land shall be maintained between disposed waste and the disposal site boundary. The buffer zone shall be of adequate dimensions to carry out environmental monitoring activities specified in Section 601.260(d) and take mitigative measures if needed.
- i) Closure and stabilization measures as set forth in the approved site closure plan shall be carried out as each disposal unit is filled and enclosed.
- j) Active waste disposal operations shall not have an adverse effect on completed closure and stabilization measures.
- k) Only wastes containing or contaminated with radioactive materials shall be disposed of at the disposal site.
- l) Proposals for disposal of waste that is not otherwise acceptable for disposal because the waste form and disposal methods must be different, must be submitted to the Department for approval.

Section 601.260 Technical Requirements - Environmental Monitoring

- a) At the time a license application is submitted, the applicant shall have conducted a preoperational monitoring program to provide basic environmental data on the disposal site characteristics. The applicant shall obtain information about the ecology, meteorology, climate, hydrology, geology, geochemistry, and seismology of the disposal site. For those characteristics that are subject to seasonal variation, data must cover at least a twelve (12) month period.
- b) During the land disposal facility site construction and operation, the licensee shall maintain an environmental monitoring program. Measurements and observations must be made and recorded to provide data to evaluate the potential health and environmental impacts during both the construction

and the operation of the facility and to enable the evaluation of long-term effects and the need for mitigative measures. The monitoring system must be capable of providing early warning of releases of radionuclides from the disposal site before they leave the site boundary.

- c) After the disposal site is closed, the licensee responsible for postoperational surveillance of the disposal site shall maintain a monitoring system based on the past monitoring performance and the closure and stabilization of the disposal site. The monitoring system must be capable of providing early warning of releases of radionuclides from the disposal site before they leave the site boundary.
- d) The licensee shall have plans for taking corrective measures if the environmental monitoring program detects migration of radionuclides which would indicate that the performance objectives may not be met.

Section 601.270 Technical Requirements - Alternative Requirements for Design and Operations

The Department shall, upon request or on its own initiative, authorize provisions other than those set forth in Sections 601.240 through 601.260 for the segregation and disposal of waste and for the design and operation of a land disposal facility on a specific basis only if the Department establishes that performance objectives of this Part will be complied with.

Section 601.280 Institutional Requirements

- a) Land ownership. Disposal of radioactive waste received from other persons may be permitted only on land owned in fee simple absolute by the Federal or State government.
- b) Institutional control. The Department will carry out an institutional control program which will physically control access to the disposal site following transfer of control of the disposal site from the disposal site operator. The institutional control program shall include, but not be limited to, carrying out an environmental monitoring program at the disposal site, periodic surveillance, minor custodial care, as determined by the Department; and administration of funds to cover the costs for these activities. Controls may not be relied upon for more than 100 years following transfer of control of the disposal site by the licensee.

Section 601.290 Alternative Requirements for Waste Classification and Characteristics

The Department shall, upon request or on its own initiative, authorize other provisions for the classification and characteristics of waste on a specific basis, only if, after evaluation of the specific characteristics of the waste, disposal site, and method of disposal, the Department finds the performance objectives specified in this Part will be met.

Section 601.300 Applicant Qualifications and Assurances

Each applicant shall show that it either possesses the necessary funds and/or has reasonable assurance of obtaining the necessary funds, to cover the estimated costs of conducting all licensed activities over the planned operating life of the project, including costs of construction and disposal.

Section 601.310 Funding for Disposal Site Closure and Stabilization

- a) The applicant shall provide assurances prior to the commencement of operations that sufficient funds will be available to carry out disposal site closure and stabilization. These assurances shall be based on Department-approved cost estimates reflecting the Department approved plan for disposal site closure and stabilization. The applicant's cost estimates must take into account total costs that would be incurred if an independent contractor were hired to perform the closure and stabilization work. The assurances shall establish that there will be sufficient funds for:
 - 1) decontamination or dismantlement of land disposal facility structures; and
 - 2) closure and stabilization of the disposal site so that following transfer of custody of the disposal site to the State or Federal government, the need for ongoing active maintenance is eliminated to the extent practicable and only minor custodial care, surveillance, and monitoring are required.
- b) In order to avoid unnecessary duplication and expense, the Department will accept financial sureties that have been consolidated with earmarked financial or surety arrangements established to meet requirements of other Federal or State agencies and/or local governing bodies for such decontamination, closure and stabilization. The Department will accept these arrangements only if the Department considers them to be adequate to satisfy these requirements and that the portion of the surety which covers the closure of the disposal site is clearly identified and committed for use in accomplishing these activities.
- c) The licensee's surety mechanism will be submitted annually for review by the Department to assure that sufficient funds are available for completion of the closure plan, assuming that the work has to be performed by an independent contractor.
- d) The amount of surety liability will be considered in accordance with the projected cost of future closure and stabilization. Factors affecting closure and stabilization cost estimates include: inflation; increases in the amount of disturbed land; changes in engineering plans; closure and stabilization that has already been accomplished; and any other conditions affecting costs. This will yield a surety that is at least sufficient at all times to cover the costs of closure of the disposal units that are expected to be used before the next license renewal.

- e) The term of the surety mechanism shall be open ended unless it can be demonstrated that another arrangement would provide an equivalent level of assurance. This assurance could be provided with a surety mechanism which is written for a specified period of time (e.g., five (5) years) yet which shall be automatically renewed unless the party who issues the surety notifies the Department and the beneficiary (the State) and the principal (the licensee) not less than 90 days prior to the renewal date of its intention not to renew. In such a situation the licensee must submit a replacement surety within 30 days after notification of cancellation. If the licensee fails to provide a replacement surety acceptable to the Department, the State may collect on the original surety.
- f) Proof of forfeiture shall not be necessary to collect the surety so that in the event the licensee cannot provide an acceptable replacement surety within the required time, the surety shall be automatically collected prior to its expiration. The conditions described above would have to be clearly stated on any surety instrument which is not open ended, and shall be agreed to by all parties. Liability under the surety mechanism shall remain in effect until the closure and stabilization program has been completed and approved by the Department and the license has been transferred to the site owner.
- g) Financial surety arrangements generally acceptable to the Department include: surety bonds, cash deposits, certificates of deposit, deposits of government securities, escrow accounts, irrevocable letters or lines of credit, trust funds, and combinations of the above or such other types of arrangements as may be approved by the Department. However, self-insurance, or any arrangement which essentially constitutes pledging the assets of the licensee, will not satisfy the surety requirement for private sector applicants since this provides no additional assurance other than that which already exists through license requirements in accordance with Sections 300 and 310.

Section 601.320 Financial Assurances for Institutional Controls

- a) Prior to the issuance of the license, the applicant shall provide for Department review and approval a copy of a binding arrangement, such as a lease, between the applicant and the disposal site owner that ensures that sufficient funds will be available to cover the costs of monitoring and any required maintenance during the institutional control period. The binding arrangement will be reviewed periodically by the Department to ensure that changes in inflation, technology, and disposal facility operations are reflected in the arrangements.
- b) Subsequent changes to the binding arrangement specified in Section 601.320(a) relevant to institutional control shall be submitted to the Department for approval.

Section 601.330 Maintenance of Records, Reports, and Transfers

- a) Each licensee shall maintain any records and make any reports in connection with the licensed activities as are required by the conditions of the license or by regulations of the Department.
- b) Records which are required by this Part or by license conditions shall be maintained for a period specified in this Chapter or by a license condition. If a retention period is not otherwise specified, these records must be maintained and transferred to the officials specified in Section 601.330(e) as a condition of license termination unless the Department authorizes their disposition because of inaccuracies or obsolescence.
- c) Records which shall be maintained pursuant to this Part may be the original or a reproduced copy or microfilm if this reproduced copy or microfilm is capable of producing a copy that is clear and legible at the end of the required retention period.
- d) If there is a conflict between the Department's regulations in this Part, other Parts, and a license condition pertaining to the retention period for the same type of record, the longest retention period specified takes precedence.
- e) Notwithstanding subsections (a) through (d), copies of records of the location and the quantity of radioactive wastes contained in the disposal site must be transferred upon license termination to local, State, and Federal governmental agencies such as are designated by the Department at the time of license termination.
- f) Following receipt and acceptance of a shipment of radioactive waste, the licensee shall record the date of disposal of the waste, the location in the disposal site, the condition of the waste packages as received, any discrepancies between materials listed on the manifest and those received, and any evidence of leaking or damaged packages or radiation or contamination levels in excess of limits specified in regulations of the U.S. Department of Transportation (49 CFR 173.441 and 173.443, revised as of November 1, 1984, exclusive of subsequent amendments or editions) and the Department (32 Ill. Adm. Code 341). The licensee shall briefly describe any repackaging operations of any of the waste packages included in the shipment, plus any other information required by the Department as a license condition.
- g) Each licensee authorized to dispose of radioactive waste received from other persons shall file a copy of its financial report or a certified financial statement annually with the Department in order to update the information base for determining financial qualifications.
- h) Annual Reports
 - 1) Each licensee authorized to dispose of waste materials received from other persons, pursuant to this Part, shall submit annual

reports to the Department. Reports shall be submitted by the end of the first calendar quarter of each year for the preceding year.

- 2) The reports shall include:
 - A) specification of the quantity of each of the principal radionuclides released to unrestricted areas in liquid and in airborne effluents during the preceding year;
 - B) the results of the environmental monitoring program;
 - C) a summary of licensee disposal unit survey and maintenance activities;
 - D) a summary, by waste class, of activities and quantities of radionuclides disposed of; and
 - E) any instances in which observed site characteristics were significantly different from those described in the application for a license.
- 3) If the quantities of radioactive materials released during the reporting period, monitoring results, or maintenance performed are different from those expected in the materials previously reviewed as part of the licensing action, the report must cover this specifically.

Section 601.340 Tests at Land Disposal Facilities

Each licensee shall perform, or permit the Department to perform, any tests the Department deems appropriate or necessary for the administration of the regulations in this Part, including, but not limited to, tests of:

- a) Radioactive wastes and facilities used for the receipt, storage, treatment, handling and disposal of radioactive wastes;
- b) Radiation detection and monitoring instruments; and
- c) Other equipment and devices used in connection with the receipt, possession, handling, treatment, storage, or disposal of radioactive waste.

Section 601.350 Department Inspections of Land Disposal Facilities

- a) Each licensee shall afford the Department at all reasonable times, the opportunity to inspect radioactive waste not yet disposed of, and the premises, equipment, operations, and facilities in which radioactive wastes are received, possessed, handled, treated, stored, or disposed.
- b) Each licensee shall make available to the Department for inspection, records kept by it pursuant to the regulations in this Part. Authorized representatives of the Department may make and keep copies, of any record required to be kept pursuant to this Part.

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER d: LOW LEVEL RADIOACTIVE
WASTE/TRANSPORTATION

PART 605
STANDARDS FOR SELECTION OF
CONTRACTORS

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AUTHORITY: Implementing and authorized by Section 5 of the Illinois Low-Level Radioactive Waste Management Act (Ill. Rev. Stat. 1985, ch. 111 1/2 pars. 241-5).

SOURCE: Adopted at 12 Ill. Reg. 4176, effective February 4, 1988.

Section 605.10 Scope

This Part sets out the standards the Director of the Department of Nuclear Safety (Director) will use when selecting a contractor for the design, development, construction, operation, and closure of the low-level radioactive waste disposal facility envisioned by the Illinois Low-Level Radioactive Waste Management Act. (The Act) (Ill. Rev. Stat. 1985, ch. 111 1/2, pars. 241-et seq.) The Department of Nuclear Safety (Department) will issue a Request for Proposals for the project. It is the intent of the Department that the project will be awarded to the proposer whose proposal, based on the standards of this Part, will result in a low-level radioactive waste disposal facility that furthers the interests of the State of Illinois, as stated in Section 2 of the Illinois Low-Level Radioactive Waste Management Act. Illinois is a member of the Central Midwest Interstate Low-Level Radioactive Waste Compact, and has been designated as the host state for a regional low-level radioactive waste disposal facility. Therefore, when selecting the proposal which will suit Illinois' needs, the Director will also evaluate the proposal with respect to implementation of policies and recommendations adopted by the Central Midwest Interstate Low-Level Radioactive Waste Compact Commission, to the extent that those policies and recommendations are not inconsistent with Illinois standards as expressed by the Illinois Low-Level Radioactive Waste Management Act and 32 Ill. Adm. Code 340, 341, 400, and 601.

Section 605.20 Number of Contractors; Use of Subcontractors

- a) The Director shall initiate contract negotiations with the single proposer or joint venture that has submitted the overall contract proposal which best conforms to the standards specified in this Part. However, if, based on the criteria stated in this Part, the Director determines that none of the proposals submitted will serve the interests of the State of Illinois, as stated in Section 2 of the Illinois Low-Level Radioactive Waste Management Act, the

Director shall not be required to accept any of the proposals. A time limit of one hundred and eighty (180) days has been established as the allowable negotiation period. If the negotiations are not completed within this period, the Director may extend the negotiation period with the selected proposer. Furthermore, if a contract cannot be negotiated with the first proposer selected, the Director may either initiate contract negotiations with another proposer or reissue the Request for Proposals. The Director reserves the right to terminate negotiations prior to the end of the negotiation period or extend negotiations thereafter.

- b) When evaluating proposals, the Director shall consider the proposed use of subcontractors and consultants. Specifically, the Director shall determine, based on the criteria set out in this Part, whether the proposed use of subcontractors and consultants will further the interests of the State of Illinois, as stated in Section 2 of the Illinois Low-Level Radioactive Waste Management Act. The Director shall not select any proposal which calls for the subcontracting of facility operation. Subcontractors will be evaluated against the same standards as contractors, but only to the extent that such standards apply to the specific responsibilities assigned to the subcontractor as set out in the proposal.

Section 605.30 Financial Integrity

- a) The proposer who is selected to be contractor shall establish that it has the financial resources necessary to design, develop, construct, operate, and close the low-level radioactive waste disposal facility. In addition, the proposer must have resources sufficient to meet the contractor's obligations regarding closure and post-closure (32 Ill. Adm. Code 601.300 - 601.320). Further, because it is likely that the low-level waste disposal facility will receive mixed waste (i.e., waste that has both radioactive and hazardous components), when evaluating the financial integrity of the proposers, the Director shall establish whether the firm is capable of meeting the financial requirements of 35 Ill. Adm. Code 724. Specifically, the Director shall negotiate a contract only with a proposer that is capable of meeting either of the following two financial tests:

- 1) Test One: The proposer must have:
 - A) Two of the following three ratios:
 - i) a ratio of total liabilities to net worth less than 2.0;
 - ii) a ratio of the sum of net income plus depreciation, depletion and amortization to total liabilities greater than 0.1;
 - iii) a ratio of current assets to current liabilities greater than 1.5; and
 - B) Net working capital and tangible net worth each at least six times the sum of the closure and post-closure costs estimates contained in the proposal; and
 - C) Tangible net worth of at least \$10 million; and
 - D) Assets in the United States amounting to at least 90 percent of its total assets or at least six times the sum of the closure and post-closure estimates contained in the proposal.
- 2) Test Two: The proposer must have:
 - A) A current rating for its most recent bond issuance of AAA, AA, A or BBB as issued by Standard and Poor or Aaa, Aa, A or Baa as issued by Moody; and

- B) Tangible net worth at least six times the sum of the closure and post-closure cost estimates contained in the proposal; and
 - C) Tangible net worth of at least \$10 million; and
 - D) Assets located in the United States amounting to at least 90 percent of its total assets or at least six times the sum of the closure and post-closure cost estimates contained in the proposal.
- b) When evaluating whether a proposer is capable of satisfying the financial requirements of 32 Ill. Adm. Code 601.300 - 601.320, the Director shall consider:
- 1) The proposer's current assets and liabilities;
 - 2) The proposer's short-term and long-term debt;
 - 3) The proposer's credit rating;
 - 4) The most recent Form 10K and all Form 10Qs since the last 10K that the proposer (or if more than one firm is proposing, all proposers) has filed with the United States Securities and Exchange Commission;
 - 5) If proposer has not filed a Form 10K with the United States Securities and Exchange Commission, audited financial statements for the past three fiscal years and quarterly financial reports for the past 2 years;
 - 6) Court decisions, decrees or agreements that have been issued or that are pending, which could adversely affect the financial well-being of the company;
 - 7) Whether the proposer has ever initiated bankruptcy proceedings, either voluntary or involuntary as well as the time and performance of the proposer since the proceedings; and
 - 8) Any additional information provided by proposer.
- c) When determining whether a proposer is capable of satisfying the financial requirements of 32 Ill. Adm. Code 601.300, 601.320, the Director shall apply the accounting standards of the Financial Accounting Standard Board of the American Institute of Certified Public Accountants, certified as of June 1, 1987, exclusive of subsequent amendments or editions.

Section 605.40 Experience of the Firm; Performance History Requirements

- a) The Director shall select as contractor a proposer who has demonstrated an ability to design, develop, construct, operate, and close a low-level radioactive waste disposal facility which incorporates *the best available management technologies which are economically reasonable, technologically feasible and environmentally sound.* (Section 6 of The Act) When evaluating whether a proposer has demonstrated this ability, the Director shall evaluate the proposer's experience developing and operating a low-level radioactive waste storage, treatment, or disposal facility. If a proposer does not have experience in both the development and operation of a low-level radioactive waste disposal facility, the Director shall evaluate the proposer's experience as either a low-level radioactive waste disposal facility developer or as a disposal facility operator, or the proposer's experience in radioactive materials management, hazardous materials management, nuclear fuel cycle facility design, construction, or operation, or other related experience presented by the proposer.
- b) The proposer shall provide a complete performance history of its activities as described in subsection (a).

When evaluating the proposer's experience, the Director shall consider for each project:

- 1) general information about the project, including:
 - A) the facility and its location;
 - B) the capacity of the facility;
 - C) the actual performance of the facility;
 - D) the type of storage, treatment or disposal method used;
 - E) the proposer's role in the project (i.e., design, construction, operation);
 - F) project incitation and completion dates;
 - G) current facility status, and, if closed, the reason for closure;
 - H) the proposer's client;
 - I) current facility manager business address and phone;
- 2) the complexity and scope of the previous project, such as, but not limited to, the previous projects' budget, duration, staffing and regulatory complexity;
- 3) the success of the project, i.e., whether the proposer met the objectives of the project in a timely manner, without exceeding anticipated costs and in a manner consistent with regulatory requirements as well as whether the client was satisfied with the proposer's performance;
- 4) whether the proposer has ever forfeited a performance bond or neglected to fulfill contract responsibilities;
- 5) whether the proposer has ever initiated or defended litigation arising from the activities, as described in the performance history, as well as the nature and outcome of such litigation;
- 6) the proposer's history with respect to licensing and regulatory compliance, including any record of safety violations or other compliance problems; and
- 7) any other information provided by the proposer.

Section 605.50 Management Qualifications of the Firm

The Director shall select as a contractor a proposer who possesses and will apply the project management resources, procedures, and expertise necessary to assure that the low-level radioactive waste disposal facility will be designed, developed, constructed, operated, and closed according to the schedule contained in the proposal. To evaluate whether a proposer meets the requisite management qualifications, the Director will review the proposed system of management and cost and quality control, the proposer's record of experience and expertise in managing projects of similar magnitude and scope and the proposed project schedules and resources dedicated to accomplishment of each task and the proposed system of quality control checks, financial controls, cost accounting procedures, and efficient use of time and personnel, by evaluating such things as the proposer's schedule of completion against statutory deadlines and also by examining the proposer's estimated costs. The Director will also review the organizational chart submitted by the proposer, which shall identify the key management positions in the project, the responsibilities assigned to each position, the chain of responsibility in the project management team, and the procedures that would be used to assure accountability and control of all phases of the project. In addition, the Director shall consider any other information provided by the proposer.

Section 605.60 Qualifications of the Employees of the Firm

- a) Because the contractor and its subcontractors will be responsible for performing a variety of activities, as set forth in this Part and Part 601, ranging from designing a facility to negotiating plans for impact assistance with local governments, when selecting a contractor to design,

develop, construct, operate and close a low-level radioactive waste disposal facility, the Director will only select a proposer that has or will obtain a qualified staff which will be assigned to the project and which meets the requirements listed below. The employee qualifications below are minimum requirements for the contractor and must be met collectively by the contractor's staff; the qualifications need not be met by a single individual.

1) Project Manager

- A) The contractor selected shall have an identified individual (or individuals) who will act as Project Manager for the designing, development, construction, operation, and closure of the low-level radioactive waste disposal facility.
- B) The Project Manager will be required to work with the Department to ensure that the project is proceeding in accordance with the provisions of the contract and in accordance with the requirements of the Illinois Low-Level Radioactive Waste Management Act.
- C) The Project Manager will also be responsible for organizing, managing, and coordinating the staff of both the contractor and the subcontractors. To assure that the Project Manager is capable of fulfilling these responsibilities, the Project Manager must have previous managerial experience on a project of similar magnitude and complexity (i.e., project of similar budget, duration, staffing, and regulatory complexity). The Project Manager must have been manager of a project which involved supervision of at least 30 professional (engineering or other technical) employees. Additionally, the Project Manager must be familiar with federal, state and local requirements applicable to radioactive or hazardous waste disposal, or with radioactive materials licensing. The Project Manager's familiarity with these regulatory requirements shall have been obtained through involvement on previous projects.

2) Senior Project Engineer. The Senior Project Engineer will be responsible for approving all engineering plans, designs, drawings, reports, specifications and other engineering documents on behalf of the contractor. Therefore, the Senior Project Engineer shall:

- A) Be a Registered Professional Engineer registered in Illinois by the Department of Registration and Education in accordance with The Illinois Professional Engineering Act (Ill. Rev. Stat. 1985, ch. 111, pars. 5101 et seq.), or be a Registered Professional Engineer in another state and be eligible for reciprocal registration within six months; and
- B) Have been a senior engineer on at least 2 other engineering projects of similar complexity and magnitude as the proposed project (i.e., project of similar budget, duration, staffing and regulatory complexity). Preference will be given to proposers who designate as a senior engineer an individual who has worked on a project for the design, development, or remediation of a radioactive waste disposal facility.

3) Mechanical Engineer. If the proposer's plan requires the services of a mechanical engineer, the mechanical engineer shall:

- A) Be a Registered Professional Engineer registered in Illinois by the Department of Registration and Education in accordance with The Illinois Professional Engineering Act, or be a Registered Professional Engineer in another state and be eligible for reciprocal registration within six months; or
- B) Have a degree in mechanical engineering and at least five years experience as a mechanical engineer.

4) Geotechnical or Civil Engineer. The geotechnical or civil engineer shall:

- A) Be a Registered Professional Engineer registered in Illinois by the Department of Registration and Education in accordance with The Professional Engineering Act, or be a Registered Professional Engineer in another state and be eligible for reciprocal registration within six months; or
- B) Have a degree in geotechnical or civil engineering and at least five years experience as a geotechnical or civil engineer.

5) Structural Engineer. The Structural Engineer will be responsible for designing structural components of the facility. To be able to accomplish this task the structural engineer will have to be knowledgeable in reinforced concrete design and construction. At a minimum, the individual identified to perform these responsibilities shall:

- A) Be a Registered Structural Engineer registered in Illinois by the Department of Registration and Education in accordance with The Structural Engineering Act (Ill. Rev. Stat. 1985, ch. 111, pars. 6501 et seq.), or be a Registered Structural Engineer in another state and be eligible for reciprocal registration within six months; and
- B) Shall have at least ten years of experience in reinforced concrete design and construction.

6) Geohydrologist. The proposer selected as contractor shall have a geohydrologist knowledgeable in geologic interpretation and hydraulic transport of contaminants through soil or other porous material. The geohydrologist shall either:

- A) Hold a Master's Degree in geology or hydrogeology, and have at least five years experience as a hydrogeologist; or
- B) Hold a Bachelor's degree in geology, and have at least eight years of experience as hydrogeologist.

7) Environmental Scientist. The proposer selected as contractor shall have an environmental scientist who:

- A) holds an advanced degree (Ph.D., M.A., or M.S.) in Environmental Science or related natural or physical science; and
- B) Has at least five years experience in evaluation and mitigation of environmental impacts.

8) Health Physicists

- A) During the design, development and planning of operation of a low-level radioactive waste disposal facility, the full time services of a health physicist will be

required to establish compliance with the requirements of 32 Ill. Adm. Code 310, 330, 341, 400, and 601. The health physicist will be responsible for developing and implementing an environmental monitoring plan, preparing an emergency response plan, and assisting the contractor in the design and development of a disposal facility which incorporates *the best available technology which is economically reasonable, technologically feasible and environmentally sound.* (Section 6 of The Act) In order to assure that the health physicist available to the contractor is competent to fulfill these responsibilities, the contractor selected must have a health physicist whose services will be dedicated to the project and who meets one of the following:

- i) Is certified by the American Board of Health Physics, 800 W. Parkdrive, Suite 400, McLean, Va., 22102, in accordance with that organizations standards for certification in effect on January 1, 1988. A copy of these standards is available from the Department;
 - ii) Holds a Doctorate (Ph.D.) in health physics, medical radiological physics or physics, and has at least three years of applied radiation protection experience; or
 - iii) Holds a Master's (M.S., M.A.) degree in health physics, or physics, and has at least five years of applied radiation protection experience.
- B) Operation. During the operation of the low-level radioactive waste disposal facility, health physicists will be needed to conduct personnel monitoring, perform environmental monitoring, inspect packages received for disposal, and perform the responsibilities of a Radiation Safety Officer. In order to assure that the health physicists available to the contractor are capable of performing duties necessary to establish compliance with the requirements of 32 Ill. Adm. Code 340 and 601, the contractor selected must have health physicists whose services will be dedicated, i.e., a full-time employee on site, to the operation of the low-level radioactive waste disposal facility. In addition, the health physicists must either:
- i) Be certified by the American Board of Health Physics, 800 W. Parkdrive, Suite 400, McLean, Va., 22102, in accordance with that organizations standards for certification in effect on January 1, 1988. A copy of these standards is available from the Department;
 - ii) Hold a Doctorate (Ph.D.) in health physics, physics, or natural or physical science, and have at least three years of applied radiation protection experience;
 - iii) Hold a Master's (M.S., M.A.) degree in health physics, physics, or natural or physical science, and have at

least five years of applied radiation protection experience; or

- iv) Hold a Bachelor's (B.S., B.A.) degree in health physics, physics, or natural or physical science, and have at least eight years of applied radiation protection experience.
- 9) Radiochemist. The contractor will be required to operate an onsite radiochemistry laboratory. This laboratory will be used to analyze incoming radioactive materials as well as samples obtained in the process of environmental monitoring. The radiochemist will be responsible for managing this laboratory and performing chemical analyses. In order to ensure that the contractor will be able to fulfill its obligation to provide radiochemistry support services, the proposer selected must have a radiochemist who:
- A) Holds an advanced degree (Ph.D., M.A., M.S.) in radiochemistry or chemistry; and
 - B) Has at least five years experience working in a radiochemistry laboratory.
- 10) Community Liaison. The community liaison will be responsible for involving all segments of the public in the decision making surrounding the development, operation, closure, and post-closure phases of the facility and will also be responsible for establishing a long-term local citizens' advisory group. To ensure that the community liaison is capable of fulfilling these responsibilities, the proposer selected must have a community liaison who will be assigned to this project and who either has:
- A) An advanced degree (Ph.D., M.S., M.A.) in public administration or a related field, e.g., public affairs, or technology and public policy, and a minimum of three years experience in conducting public participation programs, particularly those involving the siting of locally controversial land uses, such as prisons or landfills; or
 - B) A Bachelor's degree (B.A., B.S.) in public administration or a related field and a minimum of five years experience in conducting public participation programs, particularly those involving the siting of locally controversial land uses.
- 11) Support Services
- A) Comptroller - The contractor shall dedicate to the project the full-time services of a comptroller experienced in managing projects of similar budget size and complexity of the proposed project. The comptroller shall hold a degree in accounting and shall have at least five years experience.
 - B) Information Management Services Staff. The contractor will be responsible for developing and maintaining computerized record keeping systems which tracks generators, container contents, shippers, dates, certifications, treatments, package characteristics, special disposal requirements and location of containers in disposal units. These computerized record keeping systems must be compatible with the Department's systems. To ensure that the contractor is capable of fulfilling this responsibility, the

proposer shall have an information management specialist who has training in the development and maintenance of a mainframe computer system. The information management specialist shall hold a Bachelor's or graduate level degree in computer science or information management and shall have at least three years of computer programming experience.

- b) The Director shall evaluate the qualifications of any other project staff identified by the proposer in its proposal. When determining whether such staff is qualified to perform the responsibilities as identified in the proposal, the Director will evaluate staff qualifications as characterized by the proposer in the proposal. In addition, the Director will evaluate the qualifications specified by the proposer for positions which have been identified but not yet filled in order to determine whether the proposer anticipates filling vacant positions with individuals competent to perform assigned tasks. The Director also will evaluate the proposer's procedures for hiring qualified replacements when the identified staff leave the employ of the proposer.

Section 605.70 Socioeconomic Merit of Proposal

The proposer who is selected to be contractor for the design, development, construction, operation, and closure of the low-level radioactive waste disposal facility will be required to develop a plan which, if executed, would assure that the community hosting a low-level radioactive waste disposal facility would realize benefits. In order to ensure that the contractor selected is capable of developing such a plan, the Director will evaluate the proposed plan for identifying and addressing local concerns, providing public information and a forum for public involvement, and designing and negotiating programs for incentives and compensation to the host community.

- a) Public Information Plan. The Director shall evaluate the proposer's public information plan by establishing whether the plan contains the following:
- 1) A program for explaining both the potential risks and benefits associated with low-level radioactive waste disposal and the proposer's approach for minimizing the risks;
 - 2) A method for effectively identifying all interested or potentially affected parties; and
 - 3) A plan for development and distribution of sufficient, accurate, and understandable informational materials to permit and encourage public participation in the site development process.
- b) Local Involvement Plan. The Director shall evaluate the local involvement plan to establish that the proposer selected as contractor is capable of and willing to ascertain and respond to the matters of particular concern to each county or municipality which has been selected as a potential host community. When evaluating the adequacy of local involvement plans, the Director will review:
- 1) The proposer's plan for:
 - A) Guaranteeing the property value of land contiguous to the facility;
 - B) Establishing or encouraging compatible economic or other activities in the vicinity of the facility;
 - C) Preserving the local revenue attributable to property taxes on the land which will be used for the facility;
 - D) Preparing an economic and community development plan;
 - E) Providing local residents with appropriate training and jobs at the facility;

- F) Procuring goods and services locally;
 - G) Assuring procedures for local oversight of and participation in facility operation and development, including independent or cooperative monitoring and access to information regarding facility operations;
 - H) Assuring that third party liability and remedial action funds are available to meet reasonably foreseeable contingencies as described in the plan required under Section 605.80(b)(5);
 - I) Guaranteeing that the selling price of local produce is not adversely affected due to the presence of the disposal facility;
 - J) Enhancing the human and natural environment in the vicinity of the facility by establishing recreational facilities, wildlife preserves, natural areas or similar land uses;
 - K) Employing a substantial number (approximately 100) of permanent workers in professional, clerical, skilled or semi-skilled positions, with employment efforts directed at hiring local residents;
 - L) Soliciting input from local officials regarding concerns associated with hosting the disposal facility; and
 - M) Accommodating other requests and responding to other concerns that may be raised by the counties and municipalities where the alternative sites will be located.
- 2) The proposer's plan for addressing technical matters of local concern, including the following:
- A) Facility design;
 - B) Facility construction schedules, plans and procedures;
 - C) Facility operating procedures;
 - D) Monitoring systems and procedures;
 - E) Emergency, remedial action and closure plans;
 - F) Long-term care and maintenance plans;
 - G) Control and routing of transport of low-level radioactive waste to the facility; and
 - H) Solicitation of input from local officials regarding technical and procedural concerns associated with design, construction, operation, monitoring, and closing a low-level radioactive waste disposal facility.

Section 605.80 Method of Disposal

The Director shall select as a contractor a proposer who is capable of designing, constructing, operating, and closing a low-level radioactive waste disposal facility that does not incorporate the use of shallow land burial or deep well injection and that will further the objective of providing for the management of these wastes in the safest manner possible and in a manner that creates the least risk to human health and the environment of Illinois (Section 2(b) of The Act). For purposes of this Section, shallow land burial has the same definition as in the Illinois Low-Level Radioactive Waste Management Act (Section 3 of The Act). The Director will establish whether a proposer is capable of designing such a facility by evaluating a reference facility design submitted by the proposer as part of its proposal. The reference facility design shall briefly and concisely describe for consideration by the Director the proposer's concept of the best available technology that is economically reasonable, technologically feasible, and environmentally sound for the disposal of low-level radioactive waste. The reference facility design need include schematic drawings and narrative descriptions only in sufficient detail to permit an evaluation by the Department of the technical merit of the design and the

knowledge and expertise of the proposer. The reference facility design shall specifically address the role and performance of the engineered features in enhancing long-term isolation, monitoring, retrievability, or remedial action and minimizing exposure to personnel. Reference facility designs shall be evaluated according to the following criteria:

a) Disposal Facility Design

- 1) To determine whether the proposer has demonstrated an ability to meet the design constraints of 32 Ill. Adm. Code 601 and the time constraints of the Low-Level Radioactive Waste Policy Act (42 U.S.C. 2021(b), as amended by P.L. 99-240 (1985)), and the Illinois Low-Level Radioactive Waste Management Act, the Director will request each proposer to submit a reference facility design.
- 2) To make this determination, the Director will then evaluate the reference design to determine whether the proposer has applied the following criteria:
 - A) Incorporation of multiple engineered features to provide structural integrity, prevent release of material from engineered containment, and provide radiation shielding;
 - B) Incorporation of design elements that reduce the amount of waste on site and not permanently disposed of and that minimize the time waste is held on site prior to disposal;
 - C) Promotion of worker safety, including minimization of worker radiation dose to as low as is reasonably achievable;
 - D) Disposal capacity sufficient to accommodate the anticipated waste volume;
 - E) Ability of the facility to accommodate waste which is of unusual volume or shape;
 - F) Ability of the facility to accommodate mixed waste (i.e., waste which has both radioactive and chemically hazardous components); and
 - G) Flexibility to accommodate waste streams and volumes not currently identified.

b) Operating Plan. When evaluating the proposer's operating plan, the Director will evaluate the adequacy of the proposer's procedures for:

- 1) Inspection of packages;
- 2) Treatment of wastes for disposal;
- 3) Personnel monitoring;
- 4) Environmental monitoring, specifically monitoring of air, groundwater, and soil;
- 5) Contingency planning;
- 6) Maintaining records of the source and type of waste received for disposal; and
- 7) Continual in situ testing of the design and construction of disposal units, research and development of improved methods of disposal, and application of those methods.

c) Closure Plan. The Director will evaluate the adequacy of the proposer's plan for satisfying the closure requirements of 32 Ill. Adm. Code 601.150, 601.160, 601.220, 601.250, and 601.260.

Section 605.90 Procedures for Soliciting Proposals

- a) The Department shall issue a Request for Proposals for contractors to design, develop, construct, operate, and close a low-level radioactive waste disposal facility.
- b) The deadline for receiving proposals shall be no earlier than 60 days from the date that the proposal announcement is first published in the official state newspaper.

- c) All proposals received by the Department by the submission date set forth in this Request for Proposals will be catalogued and distributed by the Department for review and evaluation. All proposals will then be reviewed by the Director, departmental staff, and such experts outside the Department as the Director may designate. Following the receipt of proposals, the Director will review all proposals with respect to completeness and conformance with the instructions and requirements specifically indicated in this Request for Proposals. Proposals that are deemed incomplete or non-conforming with instructions and requirements of the Request for Proposals may not be given further evaluation. The Director reserves the right to reject any or all proposals and to waive any irregularity, variance, or informality, whether technical or substantive in nature. All proposals will be equally evaluated with respect to the completeness of the data provided, the support for the performance claims made, and the criteria established for evaluation in the Request for Proposals according to the Illinois Low-Level Radioactive Waste Management Act, and rules promulgated pursuant thereto.

d) The Director shall reject, without consideration of the merits, any proposal which is not accompanied by an acceptable one million dollar (\$1,000,000.00) proposal guaranty. The proposal guaranty is acceptable if it is in any of the following forms:

- 1) A certified check, drawn on a solvent commercial bank or trust company to the order of the Illinois Department of Nuclear Safety;
- 2) A bank check, drawn on a solvent commercial bank or trust company, to the order of the Illinois Department of Nuclear Safety;
- 3) An irrevocable letter of credit issued by a solvent commercial bank or trust company; or
- 4) A bond executed by a corporate surety company authorized to do business in the State of Illinois.

e) All proposal guaranties shall:

- 1) Be valid for at least 180 days from the proposal submission date;
- 2) Be extended at the Director's request for an additional period, up to 1365 days, without cost to the Department. The Director would request that proposal guarantees be extended if either:
 - A) No proposer was selected as a contractor within the 180 day period, or
 - B) A proposer was selected, but contract negotiations were not completed within the 180 day period.
- 3) Be returned, within 5 business days after execution of a contract for the design, development, construction, operation, and closure of the low-level radioactive waste disposal facility.

f) Failure of a successful proposer to execute the contract as proposed in his response to the Request for Proposals and file acceptable bonds within 45 days after the contract has been mailed to him shall be just cause for cancellation of the award and the forfeiture of the proposal guaranty which shall become the property of the Department, not as a penalty, but in liquidation of the damages sustained. If the contract is not executed by the Department within 30 days following receipt from the proposer of the executed contracts and bonds, the proposer shall have the right to withdraw his proposal without penalty.

Section 605.100 Waiver of Requirements

The Director shall waive any requirement of this Part if the specific objective the requirement is intended to achieve has been met or exceeded by an alternative which does not fulfill the requirement itself.

Section 605.110 Verification of Statements; Material False Statements

- a) When evaluating proposals, the Director may request and consider the advice and knowledge of others, such as representatives of local government, other state agencies and technical engineering consultants, in order to verify the validity of statements made in the proposal and to evaluate the proposer's efforts to satisfy the standards of this Part.
- b) The Director shall not select as contractor any proposer who submits a proposal which contains material false statements or material omissions. A false statement or omission is material if it prevents the Director from making an informed and accurate assessment of the proposer's ability to meet the criteria of this Part.

Section 605.120 Performance Guaranty

The successful proposer, at the time of the execution of the contract, shall deposit with the Department a performance guaranty in a form acceptable to the Department for the full amount of the contract. The performance guaranty shall be acceptable to the Department if it is of a type listed in Section 605.90(c). At the contractor's request, the amount of the performance guarantee shall be reevaluated and adjusted to reflect the costs of performing remaining contract obligations, upon the submission of application, the granting of licensing, the completion of construction, and the acceptance of waste for disposal. Guaranty amounts will be forfeited by the contractor if the contractor fails to perform its obligations as specified in the terms of the contract. Any guaranty amounts not forfeited before the first disposal module shall be released by the Department upon closure of the first disposal module.

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER d: LOW LEVEL RADIOACTIVE
WASTE/TRANSPORTATION

PART 606
REQUIREMENTS FOR THE DISPOSAL OF
LOW-LEVEL RADIOACTIVE WASTE AWAY
FROM THE POINT OF GENERATION

Section	
606.10	Scope
606.20	Definitions
606.30	Requirements for Design, Construction, Operation, Monitoring, and Maintenance of the Low-Level Radioactive Waste Disposal Facility
606.40	Recordkeeping Requirements
606.50	Technical Qualifications of Personnel
606.60	Financial Responsibility of Facility Operator
606.70	Contingency Plan and Emergency Procedures
606.80	Closure, Post-Closure, Maintenance, and Institutional Care
606.90	Emergency Closure

AUTHORITY: Implementing and authorized by Section 6 of the Illinois Low-Level Radioactive Waste Management Act 420 ILCS 20/6 .

SOURCE: Adopted at 12 Ill. Reg. 4824, effective March 1, 1988; amended at 12 Ill. Reg. 18171, effective October 31, 1988; amended at 15 Ill. Reg. 8958, effective June 10, 1991; amended at 18 Ill. Reg. 16584, effective November 1, 1994.

Section 606.10 Scope

This Part sets out standards applicable to facilities for the disposal of low-level radioactive wastes away from the point of generation. These standards are in addition to the requirements specified in the rules of the Department of Nuclear Safety entitled "Licensing Requirements of Land Disposal of Radioactive Waste" (32 Ill. Adm. Code 601). The development and operation of a disposal facility in compliance with the requirements of this Part and 32 Ill. Adm. Code 601 would *reflect the best available management technologies which are economically reasonable, technologically feasible, and environmentally sound for the disposal of low-level radioactive waste* as required by Section 6 of the Illinois Low-Level Radioactive Waste Management Act (the Act) 420 ILCS 20 .

(Source: Amended at 18 Ill. Reg. 16584, effective November 1, 1994)

Section 606.20 Definitions

Except where otherwise indicated, the terms in this Part shall have the meaning provided in 32 Ill. Adm. Code 601. In addition, the following definitions shall apply:

- a) "Accepted engineering principles and practices" means those engineering principles and practices that are used by engineers when fulfilling their requirements and duties consistent with the specific requirements of this Part and as certified by a Professional Engineer licensed under the Illinois Professional Engineering Act (Ill. Rev. Stat. 1989, ch. 111, par. 5101).
- b) "Background Level" means the alpha, beta and gamma activity of radioactive elements which occur naturally in the air, water or soils at the facility site.

- c) "Department" means the Illinois Department of Nuclear Safety.
- d) "Disposal Facility" means *a parcel of land or site, together with structures, equipment and improvements on or appurtenant to the land or site, which is used or is being developed for the disposal of low-level radioactive waste. "Facility" does not include lands, sites, structures or equipment used by a generator in the generation of low-level radioactive wastes* (Section 3 of The Act).
- e) "Disposal Module" means a discrete portion of the disposal unit, including waste, waste packages, and engineered features.
- f) "Disposal Unit" means a discrete portion of the disposal site into which waste is place for disposal.
- g) "Low-Level Radioactive Waste" (or "Waste") means *radioactive waste not classified as high-level radioactive waste as defined in Section 2 of the Nuclear Waste Policy Act of 1982, 42 U.S.C. 10101, transuranic waste, spent nuclear fuel or byproduct material as defined in Section 11e(2) of the Atomic Energy Act of 1954, 42 U.S.C. 2014. Except when otherwise indicated in the rules, low-level radioactive waste includes "mixed waste."*
- h) "Mixed Waste" means waste that is both "hazardous waste" and "low-level radioactive waste" as defined in this Act (Section 3 of The Act).
- i) "Shallow Land Burial" means *a land disposal facility in which radioactive waste is disposed of in or within the upper 30 meters of the earth's surface. However, this definition shall not include an enclosed, engineered, structurally re-enforced and solidified bunker that extends below the earth's surface* (Section 3 of The Act).

(Source: Amended at 15 Ill. Reg. 8958, effective June 10, 1991)

Section 606.30 Requirements for Design, Construction, Operation, Monitoring, and Maintenance of the Low-Level Radioactive Waste Disposal Facility

- a) Design and Construction of the Facility - Performance Objectives
The disposal facility shall be designed and constructed, based on accepted engineering principles and practices, to further the following performance objectives:
 - 1) The design and construction of the disposal facility shall utilize *the best available technology that is economically reasonable, technologically feasible, and environmentally sound for disposal of waste.* (Section 6 of the Act)
 - 2) The design of the disposal facility must be compatible with the expected waste characteristics, methods of operation, and proposed methods of closure and stabilization and shall demonstrate that the requirements of
 - 3) The facility design shall allow closure in a manner that isolates the wastes and waste constituents and that requires only minor custodial care to assure long term performance.
 - 4) The disposal facility shall be designed and constructed to provide for the complete containment of waste and waste constituents.
 - 5) The disposal facility shall be designed and constructed to allow remedial action, if necessary. Achievement of this objective shall not be accomplished by compromising, or in any way lessening, the ability of the disposal facility to satisfy the performance objectives and requirements of this Part and of 32 Ill. Adm. Code 601.

- 6) Disposal units shall be designed so that their engineered components will maintain their structural integrity and prevent release of waste and waste constituents.
- b) Design and Construction of the Facility - Requirements
- 1) The disposal facility design shall not incorporate the use of shallow land burial or underground injection wells and shall provide for the use of above-ground modules or other designs to provide greater and safer confinement of low-level radioactive waste. The disposal facility shall meet the licensing requirements of 32 Ill. Adm. Code 601.
 - 2) The facility shall be designed to accept waste for disposal for a period of at least 50 years. Requisite capacity shall be based on volume and activity projections available from the Department pursuant to Section 4 of the Act. The facility shall be designed to accommodate waste generated during the decommissioning of nuclear power stations in Illinois.
 - 3) The facility shall be designed for the disposal of low-level radioactive waste.
 - 4) Support buildings (i.e., buildings at the facility other than those in which waste is disposed of) at the facility shall meet the following requirements:
 - A) All buildings shall be designed and constructed to be permanent in nature with an estimated lifetime of at least 60 years.
 - B) During the operational period of the facility, trailers and temporary buildings shall be limited to 12 months on site.
 - C) Buildings shall be designed, constructed and maintained in accordance with the following standards:
 - i) "Occupational Safety and Health Standards" of the Occupational Safety and Health Administration, 29 CFR 1910, Subparts A through Q and Subpart S, July 1, 1991, exclusive of subsequent amendments. A copy of this material is available for inspection at the Department.
 - ii) "Safety and Health Regulations for Construction" promulgated by the Occupational Safety and Health Administration, 29 CFR 1926, July 1, 1991, exclusive of subsequent amendments. A copy of this material is available for inspection at the Department.
 - iii) Uniform Building Code, published by the National Conference of Building Officials, current as of 1994, but exclusive of subsequent amendments or editions. Copies of this code can be obtained directly from the National Conference of Building Officials, 5360 S. Workman Mills Road, Whittier CA 90601. A copy of this code is also available for inspection at the Department.
 - iv) Uniform Mechanical Code, published by the National Conference of Building Officials, current as of 1994, but exclusive of subsequent amendments or editions.
- Copies of this code can be obtained directly from the National Conference of Building Officials, 5360 S. Workman Mills Road, Whittier CA 90601. A copy of this code is also available for inspection at the Department.
- v) National Electric Code, published by the National Fire Protection Association, current as of 1993, exclusive of subsequent amendments or editions. Copies of this code can be obtained directly from the National Fire Protection Association, Batterymarch Park, Quincy MA 02269. A copy of this code is also available for inspection at the Department.
 - vi) Minimum Design Loads for Buildings and Other Structures, ASCE 7-93, current as of July 1993, exclusive of subsequent amendments or editions. Copies of the standard can be obtained directly from the American Society of Civil Engineers, 345 East 47th Street, New York, New York 10017-2398. A copy of the standard is also available for inspection at the Department.
 - vii) Local Building Codes.
 - viii) In the event that two or more building standards conflict or apply, the most stringent standard shall be met.
- 5) The disposal unit shall be designed and constructed to withstand all natural phenomena, such as precipitation, earthquakes and tornadoes, which are expected to occur for five hundred years.
- 6) The disposal unit shall meet the following design requirements:
- A) Disposal modules shall be designed and constructed to incorporate multiple engineered safety features, such as, but not limited to, placing a cover over disposal modules, using backfill that adds structural strength to the module, and reinforcing modules with manufactured materials that are independently monitored and that provide structural support, prevent the release of waste and waste constituents and prevent inadvertent intrusion (See 32 Ill. Adm. Code 601.20);
 - B) The disposal unit shall be modular, incorporating design elements that will allow operation of the facility in such a manner that the amount of waste on site that is not yet permanently disposed of, as well as the time that waste is held on site prior to disposal, will be minimized;
 - C) Disposal modules must be designed and constructed to accommodate waste that cannot be packaged in standard containers, e.g., reactor components, contaminated steel;
 - D) Disposal modules made of manufactured materials must be designed and constructed, using accepted engineering principles and practices, to ensure that the tensile stress in the manufactured materials never exceeds

the level that will cause the materials to fail. Any support provided by structural reinforcement, such as steel or rebar, shall be taken into account only if the structural reinforcement is designed and constructed to ensure maintenance of the structural reinforcement's minimum required strength for the entire design life of the disposal module;

- E) Disposal modules must be designed to maintain their structural integrity regardless of the physical form of the waste;
 - F) Disposal modules shall be designed and constructed so that water cannot infiltrate and remain in contact with waste packages;
 - G) Disposal modules must be constructed of materials that will not interact with each other, any surrounding earth, backfill, any cover material or base grade material in such a manner as to compromise the ability of the materials to perform their intended function;
 - H) If intruder barriers are required by 32 Ill. Adm. Code 601.250(b), disposal modules must be designed and constructed, using accepted engineering practices, with intruder barriers designed to last at least 500 years; and
 - I) Disposal module design shall allow characterization, modeling, analysis, and evaluation of the module's capability to contain waste.
- c) **Operation and Maintenance - Performance Objective**
The low-level radioactive waste disposal facility shall be operated in a manner that reduces the risks associated with radiation to workers and the general public to levels that are as low as is reasonably achievable.
- d) **Operation and Maintenance - Requirements**
- 1) The facility shall be operated in compliance with following requirements applicable to licensees of the Department: 32 Ill. Adm. Code 200, 310, 320, 330, 340, 341, 400 and 601.
 - 2) Waste shall not be disposed of at the facility unless the waste complies with the applicable waste form standards.* Any waste received that is not in compliance with these standards shall either be treated prior to disposal or returned to the generator or broker, provided the waste packages comply with the packaging requirements of 32 Ill. Adm. Code 341. Wastes may be treated at the disposal facility only if the operator is licensed to engage in treatment activities. If the waste packages are not in compliance with 32 Ill. Adm. Code 341, the operator shall either repackage the waste for return or treat the waste so that it is in a form which is acceptable for disposal. The generator or broker who shipped the waste to the disposal facility shall be liable for any expense incurred due to repackaging or processing unacceptable waste forms, or for expenses incurred in shipping the waste back to the generator if required.
- *AGENCY NOTE: Pursuant to Section 7 of the Illinois Low-Level Radioactive Waste Management Act 420 ILCS 20/7, the Department will be promulgating rules setting forth waste form standards.
- 3) Waste shall not be disposed at the facility unless the waste is accompanied by a proper manifest. In the event that waste is received at the facility without a proper manifest, the operator shall notify the

Department and contact the shipper to obtain a proper manifest. In the event that a proper manifest cannot be obtained, the facility operator shall take such other action as the Department requires, such as, but not limited to, analyzing the contents of the unmanifested shipment and preparing a manifest reflecting the results, and with the approval of the Department, based on requirements contained in the license and the Department's rules, disposing of the waste, in accordance with the requirements imposed by the facility license, at the shipper's expense.

- 4) The facility shall be operated so that no person outside the facility boundary receives a radiation dose in excess of 10 micro Sv (1 mrem) per year to the whole body as a result of the facility operations.
 - 5) To the extent practicable, wastes shall be disposed of in containers of standard size and shape.
 - 6) The facility shall be operated in a manner that reduces the amount of waste on site that has not yet been permanently disposed of and that minimizes the time the waste is held on site prior to disposal.
 - 7) The facility operator shall provide personnel, equipment and procedures for acquiring environmental samples and conducting on-site tests to detect any releases of radionuclides into the air, soil, water and groundwater, as well as for monitoring occupational dose in accordance with facility operator shall provide for environmental sampling and testing to detect releases of waste or waste constituents into the air, soil and water which are either, listed as hazardous in Subpart D of 40 CFR 261, or cause the waste to exhibit any of the hazardous waste characteristics identified in Subpart C of 40 CFR 261. 40 CFR 261 is incorporated as of July 1, 1993, exclusive of subsequent amendments or editions. A copy of 40 CFR 261 is available for inspection at the Department of Nuclear Safety.
 - 8) The facility operator shall not accept waste at the facility until the waste shipment has been inspected and approved by the Department, as required by Section 9(e) of the Act. The operator shall provide office space, not smaller than 20 feet by 20 feet, in a building located near the gate where waste is received, to be used by the resident inspector from the Department. The operator will maintain the building and supply electricity, heat, air conditioning, water and restroom facilities.
 - 9) The facility operator shall maintain a direct data link with the Department's offices in Springfield and shall transmit to the Department facility records regarding the receipt, handling and disposition of low-level radioactive waste as required by this Part.
 - 10) The facility operator shall maintain a public documents room.
 - 11) The facility operator shall maintain a public information center in the community where the facility is located.
 - 12) The facility operator shall make all records of facility operations available upon request of the Department pursuant to its authority under Section 8 of the Act and Section 27 of the Radiation Protection Act of 1990 420 ILCS 40/27, and shall provide access to every part of the facility to representatives of the Department.
- e) **Facility Monitoring - Performance Objective**
The low-level radioactive waste disposal facility shall include a monitoring system, which, based on accepted engineering principles and practices, is capable of determining compliance with this Part and 32 Ill. Adm. Code 601.

f) Facility Monitoring - Requirements

- 1) The disposal facility shall include a monitoring system for detecting releases of radioactive or hazardous material within the disposal modules during facility operations.
- 2) The disposal facility shall include a monitoring system for detecting releases of radioactive or hazardous materials from the disposal unit.
- 3) The disposal facility shall include a monitoring system capable of detecting releases of radioactive or hazardous materials from the facility.
- 4) The disposal facility shall include a monitoring system capable of detecting releases into the air, soil, surface water and groundwater.

g) Maintenance

- 1) The facility operator shall conduct a program of in-situ testing of the design and construction of disposal modules. The in-situ testing program shall continue during the period of operation and closure. The program shall be designed to provide additional information regarding the expected long term performance of the facility, to identify any deficiencies or defects in design and construction of disposal units, and to form the basis for recommending changes in design, construction and operation of the facility that would increase the safety or efficiency of waste disposal.
- 2) The facility operator shall, at all times, maintain the facility structures and equipment to promote occupational safety and worker protection, and to assure uninterrupted operation of the facility.

(Source: Amended at 18 Ill. Reg. 16584, effective November 1, 1994)

Section 606.40 Recordkeeping Requirements

a) Annual Report

The facility operator shall submit an annual report to the Director of the Department and shall place a copy of the report in the public documents room. This report shall contain, but need not be limited to, the following:

- 1) A summary of the sources, volumes, curie contents, and types of low-level radioactive waste received at the facility in the previous year and an inventory of the total volume and curie content of wastes disposed of at the facility since it commenced operation;
- 2) A summary of facility operations;
- 3) A description of any incidents in which radioactive materials were or could have been released, or accidents, as well as a description of any occupational exposures in excess of the limits set by 32 Ill. Adm. Code 340 which occurred during the previous year to the whole body, as a result of the facility operations;
- 4) A description of the environmental and personnel monitoring programs and the results of those programs;
- 5) A description of the status and adequacy of plans for closing the facility, actively maintaining the facility for a period of not less than 10 years following closure, and providing institutional care of the facility, specifying and considering information learned as a result of the program of in-situ testing and other facility operations during the previous year;
- 6) An accounting of the fees collected by the facility operator for deposit by the Department into the

"Low-Level Radioactive Waste Facility Closure, Post-Closure Care and Compensation Fund," established by Ill. Rev. Stat., ch. 111 1/2, par. 241-14(b). The accounting shall be performed using the accounting standards of the Financial Accounting Standards Board of the American Institute of Certified Public Accountants, current as July 1, 1987, exclusive of subsequent amendments or editions;

- 7) The results of the program for in-situ testing and evaluation of disposal unit design and construction, and recommendations; and
 - 8) A description of any events that would jeopardize the continued safe operation of the facility.
- b) Unmanifested Waste Report
The facility operator shall notify the Department inspector, immediately of any waste received at the facility that is unaccompanied by a proper manifest. In the inspector's absence, the operator shall notify the Department by telephone or telegraph within 24 hours of receipt.
- c) Closure and Remedial Action Fund Status Reports
The facility operator shall submit quarterly reports on the amounts, status, and adequacy of liability coverage and funds available for closing the facility and implementing the contingency plan.
- d) Accident Report
The facility operator shall provide a written report to the Department within seven days of any event resulting in either a release of radioactive material from a disposal unit or a radiation dose to any person outside the facility in excess of 1 millirem per year to the whole body. The report shall include:
- 1) A description of the release, resulting exposures and impacts;
 - 2) A description of the events causing such releases or exposures;
 - 3) A description of the remedial action taken; and
 - 4) A description of actions that will be taken to prevent such events from occurring in the future.

Section 606.50 Technical Qualifications of Personnel

- a) Personnel developing the facility shall meet the requirements listed below. The qualifications listed below are set forth as minimum requirements for the organization and must be met collectively, but not necessarily met by a single individual:
- 1) Project Manager
The Project Manager must have previous managerial experience on a project of similar magnitude and complexity (i.e., a project of similar budget, duration, staffing and regulatory complexity). In addition, the Project Manager must have been manager of a project which involved supervision of at least 30 professional (engineering or other technical) employees. Additionally, the Project Manager must be familiar with federal, state and local requirements applicable to radioactive or hazardous waste disposal, or with radioactive materials licensing. The Project Manager's familiarity with these regulatory requirements shall have been obtained through involvement on previous projects.
 - 2) Senior Project Engineer - The Senior Project Engineer shall:
 - A) Be a Registered Professional Engineer, registered in Illinois by the Department of Professional Regulation in accordance with the Illinois Professional Engineering Act (Ill.

- Rev. Stat. 1985, ch. 111, par. 5101, et seq.) or be a Registered Professional Engineer in another state and be eligible for reciprocal registration within six months; and
- B) Have been a senior engineer on at least 2 other engineering projects of similar complexity and magnitude (i.e., projects of similar budget, duration, magnitude and regulatory complexity) as the proposed project.
- 3) Mechanical Engineer
The mechanical engineer, if utilized, shall:
- A) Be a Registered Professional Engineer registered in Illinois by the Department of Professional Regulation in accordance with the Illinois Professional Engineering Act (Ill. Rev. Stat. 1985, ch. 111, par. 5101, et seq.) or be a Registered Professional Engineer in another state and be eligible for reciprocal registration within six months; or
- B) Have a degree in mechanical engineering and at least 5 years experience as a mechanical engineer.
- 4) Geotechnical or Civil Engineer
The geotechnical or civil engineer shall:
- A) Be a Registered Professional Engineer registered in Illinois by the Department of Professional Regulation in accordance with the Illinois Professional Engineering Act (Ill. Rev. Stat. 1985, ch. 111, par. 5101, et seq.) or be a Registered Professional Engineer in another state and be eligible for reciprocal registration within six months; or
- B) Have a degree in geotechnical or civil engineering and at least 5 years experience as a geotechnical or civil engineer.
- 5) Structural Engineer
At a minimum, the structural engineer shall:
- A) Be Registered Structural Engineers, registered in Illinois by the Department of Professional Regulation in accordance with the Illinois Structural Engineering Act (Ill. Rev. Stat. 1985, ch. 111, par. 6501, et seq.), or be a Registered Structural Engineer in another state and be eligible for reciprocal registration within six months; and
- B) Shall have at least 10 years of experience in reinforced concrete design and construction.
- 6) Geohydrologist
The geohydrologist shall either:
- A) Hold a Master's Degree in geology or geohydrology, and have at least 5 years experience as a geohydrologist; or
- B) Hold a bachelor's degree in geology and have at least 8 years of experience as geohydrologist.
- 7) Environmental Scientist
The environmental scientist shall:
- A) Hold an advanced degree (Ph.D., M.A. or M.S.) in Environmental Science or related natural or physical science (e.g., chemistry, biology, or physics); and
- B) Have at least 5 years experience in evaluating and mitigating environmental impacts.
- 8) Health Physicists
A) Design, Development and Planning of Operation
The health physicist shall either:
- i) Be certified by the American Board of Health Physics, 800 W. Parkdrive, Suite 400, McLean, Va. 22101, in accordance with that organization's standards for certification in effect on January 1, 1988. A copy of these standards is available from the Department;
- ii) Hold a Doctorate (Ph.D.) in health physics or physics and have at least three years of applied radiation protection experience; or
- iii) Hold a Master's (M.S., M.A.) degree in health physics or physics and have at least five years of applied radiation protection experience.
- B) Operation
The health physicist shall either:
- i) Be certified by the American Board of Health Physics, 800 W. Parkdrive, Suite 400, McLean, Va., 22101, in accordance with that organization's standards for certification in effect on January 1, 1988. A copy of these standards is available from the Department;
- ii) Hold a Doctorate (Ph.D.) in health physics or physics and have at least three years of applied radiation protection experience;
- iii) Hold a Master's (M.S., M.A.) degree in health physics or physics and have at least five years of applied radiation protection experience; or
- iv) Hold a Bachelor's (B.S., B.A.) degree in health physics or in a natural or physical science, and have at least eight years of applied radiation protection experience.
- 9) Radiochemist
The radiochemist shall:
- A) Hold an advanced degree (Ph.D., M.A., M.S.) in radiochemistry or chemistry; and
- B) Have at least 5 years experience working in a radiochemistry laboratory.
- 10) Community Liaison
The community liaison shall have either:
- A) An advanced degree (M.S., M.A., Ph.D.) in public administration or a related field (e.g., public affairs, technology and public policy) and a minimum of three years experience in conducting public participation programs, particularly those involving the siting and of locally controversial land uses; or
- B) A bachelor's degree (B.A., B.S.) in public administration or a related field and a minimum of five years experience in conducting public participation programs, particularly those involving the siting of locally controversial land uses (such as prisons or sanitary landfills).
- b) Personnel operating facility:
In addition to individuals listed in subsection (a), the operator shall have a comptroller and a management information services staff that meets the following qualifications:
- 1) Comptroller - The comptroller shall be experienced in managing projects of similar budget size and complexity of the proposed project. The

comptroller shall hold a degree in accounting and shall have at least 5 years experience.

- 2) Information Management Services Specialist
The information management specialist shall hold a bachelor's or graduate level degree in computer science or in Information Management and shall have at least three years of computer programming experience.

- c) All personnel shall have training in the following:

- 1) The characteristics of radiation;
- 2) The significance of radiation dose;
- 3) The levels of radiation from sources of radiation;
- 4) Methods of controlling radiation dose, including working time, working distances, and shielding;
- 5) Use of personnel monitoring equipment; and
- 6) The operator's operating and emergency procedures.

Section 606.60 Financial Responsibility of Facility Operator

- a) The facility operator shall meet either of the following tests to establish that it has the financial resources necessary to meet its financial obligations established under 32 Ill. Adm. Code 601, and the Illinois Low-Level Radioactive Waste Management Act.

- 1) Test One: The operator must have:

- A) Two of the following three ratios: a ratio of total liabilities to net worth less than 2.0; a ratio of the sum of net income plus depreciation, depletion and amortization of total liabilities greater than 0.1; and a ratio of current assets to current liabilities greater than 1.5; and
- B) Net working capital and tangible net worth each at least six times the sum of the closure and post-closure costs estimates provided in the license application as required by 32 Ill. Adm. Code 601.310; and
- C) Tangible net worth of at least \$10 million; and
- D) Assets in the United States amounting to at least 90 percent of its total assets or at least six times the sum of the closure and post-closure estimates contained in license application.

- 2) Test Two: The operator must have:

- A) A current rating for its most recent bond issuance of AAA, AA, A, or BBB as issued by Standard and Poor or Aaa, Aa, A or Baa as issued by Moody; and
- B) Tangible net worth at least six times the sum of the closure and post-closure cost estimates contained in the license application as required by 32 Ill. Adm. Code 601.310; and
- C) Tangible net worth of at least \$10 million; and
- D) Assets located in the United States amounting to at least 90 percent of its total assets or at least six times the sum of the closure and post-closure cost estimates contained in the proposal.

- b) When determining whether the facility operator has satisfied the financial requirements of subsection (a), the Department shall apply the accounting standards of the Financial Accounting Standards Board of the American Institute of Certified Public Accountants current as of July 1, 1987, exclusive of subsequent amendments or editions.

- c) The facility operator shall *post a performance bond with the Department or show evidence of liability insurance or other means of establishing financial responsibility in an amount sufficient to adequately provide for any necessary remedial actions or liabilities that might be incurred by the operation of a facility during the operating period and during a reasonable period of post-closure care* (Section 6(b) of The Act).

(Source: Amended at 15 Ill. Reg. 8958, effective June 10, 1991)

Section 606.70 Contingency Plan and Emergency Procedures

- a) Purpose and Implementation of Contingency Plan

- 1) The operator must have contingency plan for the facility. The contingency plan must be designed to minimize risks to human health and the environment from fires, explosions or any unplanned release, sudden or gradual, of waste or waste constituents to air, soil, surface water, and groundwater. The plan must also be designed to minimize risks or consequences that would result from temporary or premature closure of the disposal facility.
- 2) The provisions of the contingency plan must be carried out immediately whenever there is a fire, explosion, release of waste or waste constituents to the environment, or whenever there is an unscheduled closure of the facility, either temporary or permanent.

- b) Content of Contingency Plan; Procedures

- 1) The facility operator shall prepare a contingency plan which provides the response action to be taken in the event that there is a release of radionuclides, there is a temporary inability to dispose of wastes at the facility (e.g., because the facility has been closed temporarily), or the facility is permanently closed. Plans shall be specific to the particular contingency being addressed and shall include at a minimum the specific information required by subsection (b)(2).
- 2) The facility operator shall consult with the Department and the Illinois Emergency Services and Disaster Agency and prepare a contingency plan to respond to a potential release of radionuclides. Local authorities shall also be encouraged to assist in the preparation of the contingency plan. At a minimum, this plan shall contain the following:
 - A) A description of the licensee's facility and the area near the site;
 - B) An identification of each type of accident for which protective actions for the public may be needed;
 - C) An analysis of the potential doses to the public from each type of accident;
 - D) Identification of the means of detecting each type of accident in a timely manner;
 - E) A description of the procedures and equipment for mitigating the consequences of each type of accident, including equipment provided to protect workers on-site;
 - F) A description of the methods and equipment used to monitor and evaluate releases of radioactive materials;
 - G) A description of the responsibilities of the operator's personnel should an accident occur, including identification of personnel

- responsible for notifying off-site authorities and notifying the Department;
- H) A description of the means for notifying immediately off-site authorities and for requesting off-site assistance resources;
 - I) A description of the methods for assuring that recommended protective actions and distances are communicated to response organizations and the public;
 - J) A description of instructions the operator would give to fire, police, medical, and other emergency personnel;
 - K) A description of the means for restoring the facility to a condition that is consistent with the provisions of this Part, Part 601, and the terms of the facility license, after an accident and for remediating releases to unrestricted areas to background levels;
 - L) Provisions for conducting on-site drills prior to initial receipt of waste for disposal, at least once annually thereafter, and within 30 days after any amendment of the contingency plan which is required by subsection (d)(1)(A), (B), or (C). Local fire, police, medical and other personnel who might be called upon in an emergency shall be allowed to participate in the drills;
- c) **Copies of Contingency Plan**
A copy of the contingency plan and all revisions to the plan must be:
- 1) Maintained at the facility;
 - 2) Submitted to the Department;
 - 3) Submitted to the Illinois Emergency Services and Disaster Agency; and
 - 4) Submitted to all local police departments, fire departments, hospitals, and state and local emergency response teams that might be called upon to provide emergency services.
- d) **Amendment of Contingency Plan**
- 1) The contingency plan must be reviewed and immediately amended, if necessary to maintain compliance with this Section, whenever:
 - A) The facility license is revised;
 - B) The existing contingency plan fails when actually applied;
 - C) The facility changes in a way that materially increases the potential for fires, explosions or releases of waste or waste constituents (e.g., a change of manufactured materials used, a change in facility design) or changes the response necessary in the event of an emergency;
 - D) The list of emergency coordinators changes; or
 - E) The list of emergency equipment changes.
 - 2) If the contingency plan is amended to comply with subsections (d)(1)(A), (B), or (C), the complete plan, as amended, shall be distributed to those entities identified in subsection (c) above. If the plan is amended to comply with subsections (d)(1)(D) or (E), only the revised lists need be distributed.
 - 3) The contingency plan shall be reviewed and revised as necessary, at least once every five years.
- e) **Emergency Coordinator**
- 1) At all times, there must be at least one employee either on the facility premises or on call (i.e., available to respond to an emergency by reaching

the facility within 60 minutes) who is responsible for coordinating all emergency response measures.

- 2) This emergency coordinator must be thoroughly familiar with all aspects of the facility's contingency plan, all operations and activities at the facility, the location and characteristics of waste handled, the location of all records within the facility and the facility layout. In addition, this person must have the authority to commit the resources needed to carry out the contingency plan. The emergency coordinator must also be competent to carry out responsibilities as described in subsection (b).

Section 606.80 Closure, Post-Closure, Maintenance, and Institutional Care

- a) **Closure, Post-Closure, Maintenance and Institutional Care - Performance Objective:**
- 1) The facility shall be closed in a manner that isolates waste and requires only minor custodial care for ongoing maintenance to assure long term performance.
 - 2) The facility shall be closed in a manner which considers future beneficial uses, so documented in the provisions required under 32 Ill. Adm. Code 605, of the site and surrounding areas consistent with 32 Ill. Adm. Code 605.70(b). This objective shall not be accomplished by any method which compromises, or in any way, lessens the ability of the facility to be closed in accordance with other objectives and requirements of this Part and 32 Ill. Adm. Code 601.
- b) **Closure, Post-Closure, Maintenance and Institutional Care Requirements:**
- 1) **Closure Plan** - The facility operator shall prepare a closure plan prior to constructing the facility. The plan shall be consistent with the performance objectives of this Part and 32 Ill. Adm. Code 601, and shall include, but need not be limited to the following:
 - A) A procedure for disposal of all waste and contaminated equipment remaining on site at the time of closure, removal of structures and equipment, and installation of permanent markers;
 - B) An estimate of the funds needed to close the facility, and provisions for assuring the availability of those funds pursuant to 32 Ill. Adm. Code 601, and Section 14(b) of The Act;
 - C) A description of how the facility closure will satisfy the performance objectives of this Section and the requirements of 32 Ill. Adm. Code 601;
 - D) A description of the permissible users of the facility and buffer zone following any closure; and
 - E) A description of the monitoring systems to be implemented during the closure, post-closure, and institutional control periods.
 - 2) **Closure Funds** - The facility operator shall maintain or provide for the availability of funds sufficient to implement the closure plan. The amount of the funds shall be based on the assumption that an independent contractor other than the facility operator, will be hired to implement the plan. Mechanisms for assuring that closure funds are available are as specified in 32 Ill. Adm. Code 601.310(g).

- 3) Disposal Module Closure:
 - A) The facility operator shall close each disposal module as it reaches its designed waste capacity, or sooner, if needed for safe operation, e.g., to avoid unnecessarily subjecting open modules to freeze/thaw cycles, or to avoid unnecessary worker exposures. Closures shall be in accordance with the plan for facility closure and pursuant to a license amendment granted by the Department in accordance with 32 Ill. Adm. Code 601.
 - B) The facility operator shall submit an application to the Department for a license amendment to close each disposal module not more than 90 days or less than 30 days prior to any anticipated closure.
 - C) Not later than 30 days following any disposal unit closure, the facility operator shall certify in writing to the Department that the disposal unit has been closed in accordance with the requirements of this Part.
- 4) Facility Closure:
 - A) The facility operator shall close the facility at the end of its operating lifetime.
 - B) Not more than two years nor less than one year prior to anticipated facility closure, the facility operator shall submit an application to the Department for a license amendment to close the facility.
 - C) Upon granting of the license amendment, the facility operator shall close the facility in accordance with the closure plan and the license conditions imposed.
 - D) Within six months of completing facility closure, the facility operator shall certify in writing to the Department that the facility has been closed in accordance with the requirements of this Part.
- c) Post-Closure Active Maintenance Requirements:
 - 1) Post-Closure Active Maintenance Plan - The facility operator shall prepare, prior to constructing the facility, a plan for active facility maintenance. The plan shall be consistent with the performance objectives of this Part and 32 Ill. Adm. Code 601, and shall include, but need not be limited to:
 - A) A procedure for accepting, and evaluating, the performance of both engineered and natural barriers to radionuclide release or migration at the facility.
 - B) A procedure for monitoring the air, soil, surface water, and groundwater at the facility site.
 - C) A procedure for confirming that the facility will meet the long term performance objectives of this Part or the requirements of 32 Ill. Adm. Code 601.
 - D) A procedure for identifying potential failure to meet the performance objectives of this Part or the requirements of 32 Ill. Adm. Code 601.
 - E) A procedure for correcting any condition that would result in a failure to meet the performance objectives of this Part or the performance objectives of 32 Ill. Adm. Code 601.
 - F) An estimate of the funds needed to implement the plan for a period of ten years.
- 2) Post-Closure Active Maintenance:
 - A) The facility operator shall conduct a program for active site maintenance for a ten year period following facility closure.
 - B) The operator shall remain at the facility site, inspect and repair engineered barriers, as necessary, maintain site security, and continue the program of facility monitoring and reporting to the Department.
- d) Institutional Care and Monitoring: Requirements
 - 1) Institutional Care and Maintenance Plan - The facility operator shall prepare, prior to constructing the facility, a plan for the long term care, maintenance, and monitoring of the facility. The plan shall describe the activities to be taken by the site owner following the ten year period of active maintenance by the facility operator and after transfer of title and custody and termination of the facility license. The plan shall be consistent with the performance objectives of this Part and 32 Ill. Adm. Code 601, and shall include but need not be limited to the following:
 - A) A procedure for monitoring the air, soil, surface, and groundwater at the facility site, and in the vicinity of the facility site.
 - B) Plans for taking remedial action in the event that the facility fails to meet the performance objectives of this Part and 32 Ill. Adm. Code 601.
 - C) An estimate of the costs necessary to carry out the institutional monitoring plan for a period of 300 years.
 - D) An estimate of the costs of implementing the remedial action plans.
- e) Transfer of Custody - At the end of the post-closure care and maintenance period, the facility operator shall submit a report to the Department regarding the projected long term performance of the facility and shall apply for a license amendment, in accordance with the requirements of 32 Ill. Adm. Code 601.170, for termination of the license and transfer of title and custody of the facility to the State of Illinois.

(Source: Amended at 12 Ill. Reg. 18171, effective October 31, 1988)

Section 606.90 Emergency Closure

- a) Upon finding that immediate closure of the facility is necessary to avoid an imminent threat to the public health or safety, or the environment, the Director of the Department shall issue an emergency closure order to the facility operator. An emergency closure order may be issued by the Director in the event of either:
 - 1) A finding of non-compliance with any applicable regulation of the Department, if such non-compliance is determined by the Director to pose a risk of a release of radioactive material beyond the site boundary in excess of any applicable limit imposed by 32 Ill. Adm. Code 340, or an occupational dose in excess of the performance standards imposed by 32 Ill. Adm. Code 601 and this Part; or
 - 2) A finding that continued operation of the facility represents a significant and immediate threat to the public health or safety, as evidenced by a violation of any provisions of the Radiation Protection Act of 1990 or Illinois Low-Level Radioactive Waste Management Act or any code, rule, regulation or

order promulgated under these Acts, and that requires immediate action to protect the public welfare (Section 38 of the Radiation Protection Act of 1990 420 ILCS 40/38 and Section 8 of the Act).

- b) Upon receipt of a written order requiring immediate closure, the facility operator shall immediately take the following actions:
- 1) Implement the contingency plan required by Section 606.70;
 - 2) Notify all persons holding a site use permit or similar evidence of permission to use the facility; and
 - 3) Notify the Central Midwest Interstate Low-Level Radioactive Waste Commission.

(Source: Amended at 18 Ill. Reg. 16584, effective November 1, 1994)

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER d: LOW LEVEL RADIOACTIVE
WASTE/TRANSPORTATION

PART 620
REGISTRATION OF LOW-LEVEL
RADIOACTIVE WASTE GENERATORS

Section	
620.10	Definitions
620.20	Generator Registration
620.25	Broker Registration
620.30	Filing Of Annual Report by Generators
620.35	Filing of Annual Reports by Brokers
620.40	Payment of Fees for Waste Storage
620.50	Payment of Fees for Waste Shipped
620.60	Payment of Fees - Small Generators
620.70	Payment of Fees - Nuclear Power Reactors
620.80	Non-Compliance with Registration and Filing of Reports
620.90	Deposit of Fees

AUTHORITY: Implementing and authorized by Sections 3 and 4 of the Illinois Low-Level Radioactive Waste Management Act (Ill. Rev. Stat. 1986 Supp., ch. 111 1/2, par. 241-3 and 241-4).

SOURCE: Emergency rule at 8 Ill. Reg. 18519, effective September 20, 1984, for a maximum of 150 days; adopted at 9 Ill. Reg. 2287, effective January 31, 1985; Emergency amendment at 9 Ill. Reg. 17433, effective October 25, 1985, for a maximum of 150 days; amended at 10 Ill. Reg. 7818, effective April 29, 1986; Emergency amendment at 10 Ill. Reg. 21956, effective December 26, 1986, for a maximum of 150 days; adopted at 11 Ill. Reg. 7646, effective April 9, 1987.

Section 620.10 Definitions

As used in this Part, the following definitions shall apply:

"Act" means the Illinois Low-Level Radioactive Waste Management Act (The Act), (Ill. Rev. Stat. 1986 Supp., ch. 111 1/2, pars. 241-1 et seq.).

"Broker" means any person who takes possession of low-level radioactive waste solely for purposes of consolidation and shipment.

"Department" means the Department of Nuclear Safety.

"Disposal" means the isolation of waste from the biosphere in a permanent facility designed for that purpose.

"Generator" means any person who produces or possesses low-level radioactive waste in the course of or incident to manufacturing, power generation, processing, medical diagnosis and treatment, research, education or other activity.

"Low-Level Radioactive Waste" means radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel or byproduct material as defined in Section 11e(2) of the Atomic Energy Act of 1954 (42 U.S.C. 2014).

"Person" means an individual, corporation, business enterprise or other legal entity either public or private and any legal successor, representative, agent or agency of that individual, corporation, business enterprise, or legal entity.

"Storage" means the holding of waste for treatment or disposal for a period of twenty-four hours or more.

"Treatment" means any method, technique or process, including storage for radioactive decay, designed to change the physical, chemical or biological characteristics or composition of any waste in order to render the waste safer for transport, storage or disposal, amendable to recovery, convertible to another usable material or reduced in volume.

"Waste" See: "Low-Level Radioactive Waste".

(Source: Amended at 11 Ill. Reg. 7646, effective April 9, 1987)

Section 620.20 Generator Registration

All generators shall register with the Department within 60 days of commencement of producing or possessing any quantity of low-level radioactive waste in Illinois. Registration shall be on a form developed by the Department and shall include: (Supp. Ill. Rev. Stat., 1983, ch. 111 1/2, par. 241-4(a)).

- a) name, address and officers of the generator, and
- b) the types and amount of wastes produced or possessed and to be produced or possessed.

Section 620.25 Broker Registration

All existing brokers shall register with the Department within 180 days of the effective date of the amendatory Act of 1986. (The Act) (Ill. Rev. Stat. 1986 Supp., ch. 111 1/2, par. 241-4(a)). New brokers shall register within 60 days of taking possession of any low-level radioactive waste or 180 days after the effective date of the amendatory Act, whichever is later. Registration shall be on a form developed by the Department and shall include:

- a) the name, address, and officers of the broker,
- b) the type and amount of low-level radioactive waste received by the broker for purposes of consolidation and shipment, and
- c) the name and address of each low-level radioactive waste generator from whom low-level radioactive waste has been received by the broker.

(Source: Added at 11 Ill. Reg. 7646, effective April 9, 1987)

Section 620.30 Filing Of Annual Report by Generators

Each generator who has generated any low level waste during a given calendar year shall file an annual report with the Department. For the calendar year 1984, the annual report shall be submitted by March 1, 1985. For subsequent years, the annual report shall be submitted by February 1 as required by Ill. Rev. Stat 1986 Supp., Ch. 111 1/2, par. 241-4(b). This report shall be on a form developed by the Department and shall include:

- a) the name, address and officers of the generator,
- b) the types and amounts of waste produced or possessed during the prior calendar year,
- c) the types and amounts of waste expected to be produced or possessed during the next calendar year,
- d) waste stored during the prior calendar year, including types and amounts,
- e) waste shipped during the prior calendar year including types, amounts, dates, destination and means of shipment,

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- f) whether reports were filed with the Department and fees paid to the Department during the prior calendar year for waste stored,
- g) whether reports were filed with the Department and fees paid to the Department during the prior calendar year for waste shipped,
- h) whether any additional waste was stored and not reported to the Department,
- i) whether any additional waste was shipped and not reported to the Department,
- j) *methods used to treat, store, and dispose of waste,*
- k) *technological feasibility, economic reasonableness and environmental soundness of alternative treatment, storage and disposal methods,*
- l) name and address of broker(s) used, and
- m) the names of such disposal sites if direct shipments to disposal sites were made.

(Source: Amended at 11 Ill. Reg. 7646, effective April 9, 1987)

Section 620.35 Filing of Annual Reports by Brokers

Each broker who has taken possession of any low-level radioactive waste during a given calendar year shall file an annual report with the Department. The first annual report shall be for calendar year 1986, and shall be submitted by February 1, 1987 or 45 days after registering with the Department, whichever is later. For subsequent years, the annual report shall be submitted by February 1. This report shall be on a form developed by the Department or, by electronic means (e.g. computer diskette, on-line computer communication) that are compatible with the Department's computer capabilities. The report shall include:

- a) the name, address and officers of the broker.
- b) for waste shipped to disposal sites outside Illinois during the prior year, the disposal manifest information kept pursuant to 32 Ill. Adm. Code 340.3110. The original generator name and address and waste volume for each generator must be given for each shipment.
- c) for waste permanently disposed of in Illinois during the prior year, in addition to the manifest information described in subsection (b), the types, amounts, dates disposed of and disposal method(s).
- d) for each shipment of waste received, the name and address of the generator from whom the waste was received and the volume and type of waste received.
- e) for waste shipped for storage or treatment, the name and address of the entity to whom the waste is shipped and the volume and type of waste shipped.

(Source: Added at 11 Ill. Reg. 7646, effective April 9, 1987)

Section 620.40 Payment of Fees for Waste Storage

- a) Generators which have stored any quantity of waste for shipment at a later date shall pay a fee to the Department in accordance with the following:
 - 1) For waste stored between September 8, 1984, and December 31, 1984, for shipment at a later date, a fee shall be paid to the Department by no later than January 31, 1985. The fee shall be in the amount of \$2 per cubic foot of all such waste stored for shipment.
 - 2) For waste stored on or after January 1, 1985, but before October 1, 1985, for shipment at a later date, fees shall be paid to the Department quarterly by any generator which has stored 100 cubic feet or more of waste during the prior quarter or since filing its last report with the Department. These fees shall be paid by May 1, August 1 and

November 1, 1985. A fee shall be paid by February 1, 1986 by any generator which has stored less than 100 cubic feet of waste during this period. The fee shall be in the amount of \$2 per cubic foot of all such waste stored for shipment.

- 3) For waste stored between October 1, 1985, and December 31, 1985, for shipment at a later date, a fee shall be paid to the Department by no later than February 1, 1986. The fee shall be in the amount of \$3 per cubic foot of all such waste stored during this period.
- 4) For waste stored on or after January 1, 1986, for shipment at a later date, a fee shall be paid to the Department annually by no later than February 1 of the subsequent calendar year. The fee shall be in the amount of \$3 per cubic foot of all such waste stored for shipment.
- b) The fee shall be accompanied by a completed form prescribed by the Department which identifies the types and amounts of waste stored during that period. Generators shall be responsible for reporting and paying all fees due and owing in accordance with this Section, except as provided in Sections 620.60 and 620.70.

(Source: Amended at 10 Ill. Reg. 7818, effective April 29, 1986)

Section 620.50 Payment of Fees for Waste Shipped

- a) Generators which have shipped any quantity waste for storage, disposal or treatment shall pay a fee to the Department in accordance with the following:
 - 1) For waste shipped between December 13, 1983 and September 7, 1984, a fee shall be paid to the Department by no later than December 1, 1984. The fee for all such waste shipped between December 13, 1983 and September 7, 1984 shall be in the amount of \$1 per cubic foot of waste shipped.
 - 2) For waste shipped between September 8, 1984 and December 31, 1984, a fee shall be paid to the Department by no later than February 1, 1985. The fee shall be in the amount of \$1 per cubic foot for waste which had been stored prior to September 8, 1984. The fee shall be in the amount of \$2 per cubic foot for waste which had not been stored prior to September 8, 1984, except that no fee shall be assessed if a fee has already been paid to the Department for storage of that waste in accordance with Section 620.40.
 - 3) For waste shipped on or after January 1, 1985, but before October 1, 1985, fees shall be paid to the Department quarterly by any generator which has shipped 100 cubic feet or more of waste during the prior quarter or since filing its last report with the Department. These fees shall be paid by May 1, August 1 and November 1 1985. A fee shall be paid by February 1, 1986, by any generator which has shipped less than 100 cubic feet of waste during this period. The fee shall be in the amount of \$1 per cubic foot for waste which has been stored prior to September 7, 1984. The fee shall be in the amount of \$2 per cubic foot for waste which has not been stored prior to September 7, 1984, except that no fee shall be assessed if a fee has already been paid to the Department for storage of that waste in accordance with Section 620.40.
 - 4) For waste shipped between October 1, 1985, and December 31, 1985, a fee shall be paid to the Department by no later than February 1, 1986. The

fee shall be in the amount of \$1 per cubic foot for waste which had been stored prior to September 7, 1984. The fee shall be in the amount of \$2 per cubic foot for waste which had been stored between September 7, 1984, and October 1, 1985. The fee shall be in the amount of \$3 per cubic foot for waste which has been stored on or after October 1, 1985, except that no fee shall be assessed if a fee has already been paid to the Department for storage of that waste in accordance with Section 620.40.

- 5) For waste shipped on or after January 1, 1986, a fee shall be paid to the Department annually by no later than February 1 of the subsequent calendar year. The fee shall be in the amount of \$1 per cubic foot for waste which had been stored prior to September 7, 1984. The fee shall be in the amount of \$2 per cubic foot for waste which had been stored between September 7, 1984, and October 1, 1985. The fee shall be in the amount of \$3 per cubic foot for waste which had been stored on or after October 1, 1985, except that no fee shall be assessed if a fee has already been paid to the Department for storage of that waste in accordance with Section 620.40.
- b) The fee shall be accompanied by a completed form prescribed by the Department which identifies the types and amount of waste shipped during that period. Generators shall be responsible for reporting and paying all fees due and owing in accordance with this Section, except as provided in Sections 620.60 and 620.70.

(Source: Amended at 10 Ill. Reg. 7818, effective April 29, 1986)

Section 620.60 Payment of Fees - Small Generators

Effective October 1, 1985, any generator of low-level radioactive waste which was not subject to fees in the amount of at least \$50 for waste stored and shipped during a given calendar year in accordance with Section 620.40 and 620.50, shall pay a fee in the amount of \$50 for that calendar year to the Department. Such fee shall be payable annually by February 1 of the subsequent calendar year.

(Source: Former Section 620.60 renumbered to Section 620.80, New Section 620.60 adopted at 10 Ill. Reg. 7818, effective April 29, 1986)

Section 620.70 Payment of Fees - Nuclear Power Reactors

Effective January 1, 1986, the owner of any nuclear power reactor in Illinois for which an operating license has been issued by the Nuclear Regulatory Commission shall be *required to pay an annual fee of \$90,000 for the treatment, storage and disposal of low-level radioactive waste. Such fees shall be due and payable on January 1st of each year, beginning January 1, 1986.* (P.A. 84-496, effective October 1, 1985.)

(Source: Former Section 620.70 renumbered to Section 620.90, New Section 620.70 adopted at 10 Ill. Reg. 7818, effective April 29, 1986)

Section 620.80 Non-Compliance with Registration and Filing of Reports

If any person fails or refuses to register with the Department, to file required reports with the Department, or to pay the required fees, the Department shall notify the person by registered mail that he has thirty (30) days to respond, after which the Department will refer the case to the Attorney General. *Any person failing to pay the fees shall be liable*

to a civil penalty not to exceed four times the amount of the fees not paid. (Ill. Rev. Stat., 1984 Supp., ch. 111 1/2, par. 241-17(c)).

(Source: Renumbered from Section 620.60 and amended at 10 Ill. Reg. 7818, effective April 29, 1986)

Section 620.90 Deposit of Fees

The Department shall deposit 80% of all fees collected under this Part in the State Treasury to the credit of the Low-Level Radioactive Waste Facility Development and Operation Fund. The Department shall deposit 20% of all such fees collected in the State Treasury to the credit of the Low-Level Radioactive Waste Facility Closure, Post-Closure Care and Compensation Fund.

(Source: Renumbered from Section 620.70 at 10 Ill. Reg. 7818, effective April 29, 1986)

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TITLE 32: ENERGY
CHAPTER II: DEPARTMENT OF NUCLEAR
SAFETY
SUBCHAPTER e: GENERAL ADMINISTRATION

PART 700
DEPARTMENT OF NUCLEAR SAFETY SCIENCE
SCHOLARSHIP PROGRAM

Section	
700.10	Purpose
700.20	Definitions
700.30	Scope of Science Education Scholarship Program
700.40	Qualification Criteria
700.50	Conditions of Award
700.60	Scholarship Application and Selection Process
700.70	Scholarship Application Procedures

AUTHORITY: Implemented and authorized by the Nuclear Safety Education Assistance Act (Ill. Rev. Stat. 1988 Supp., ch. 144, par. 2504 et seq.).

SOURCE: Adopted at 13 Ill. Reg. 17444, effective October 30, 1989.

Section 700.10 Purpose

The purpose of this Part is to implement a scholarship program to help advance the body of knowledge and assure the continued availability and expertise regarding radiation safety matters by supporting educational programs and research related to nuclear safety, including radiation protection and nuclear engineering, in Illinois public institutions of higher education, and by supporting participation in these programs by qualified students.

Section 700.20 Definitions

"Act" means the Nuclear Safety Education Assistance Act (Ill. Rev. Stat. 1988 Supp., ch. 144, par. 2504 et seq.).

"Adult" means a person eighteen years of age or older.

"Approved program of research" means an academic investigation approved by and conducted by or under the control of a public institution of higher education, as determined by the Director of the Department in accordance with the provisions of this Part.

"Department" means the Illinois Department of Nuclear Safety.

"Director" means the Director of the Illinois Department of Nuclear Safety.

"Eligible program of study" means a formal course of study leading to a Baccalaureate or higher degree from a public institution of higher education, as determined by the Director. Eligible programs of study include, but are not limited to, the following: Biology, Chemistry, Engineering, Geology, Health Physics, Hydrogeology, Industrial Hygiene, and Physics. Expertise in the foregoing subjects is needed for the Department to fulfill its statutory responsibilities under the Radiation Protection Act (Ill. Rev. Stat. 1987, ch. 111 1/2, par. 211 et seq.), the Illinois Low-Level Radioactive Waste Management Act (Ill. Rev. Stat. 1987, ch. 111 1/2, par. 241-1 et seq.), and

the Illinois Nuclear Safety Preparedness Act (Ill. Rev. Stat. 1987, ch. 111 1/2, par. 4301 et seq.).

"Illinois Resident" means a person who, at the time of applying for a scholarship under this Part, is either:

An adult whose domicile has been in Illinois for a period of at least two years immediately preceding submission of an application for a scholarship;

An adult whose domicile is in Illinois and at least one of whose parents has established and is maintaining a residence in Illinois;

A minor whose domicile is in Illinois. A minor's domicile is that of his parents if they are living together, or that of the living parent if one is deceased, or if the parents are separated or divorced, that of the parent to whom the custody of the minor has been awarded by court decree or order, or in the absence of a court decree or order, that of parent with whom the minor has continuously resided for a period of at least two years, or if the minor has a legal guardian other than a parent, the residence of that legal guardian; or

An emancipated minor who has maintained a domicile within the State of Illinois for a period of at least two consecutive years immediately prior to applying for a scholarship or whose parents have established and are maintaining a domicile in the State. An emancipated minor is one who is completely or predominantly self-supporting. Marriage shall be regarded as affecting the emancipation of minors, whether male or female.

"Minor" means a person under the age of eighteen.

"Public institution of higher education" means an Illinois public institution of higher education as defined in "AN ACT creating a Board of Higher Education, defining its powers and duties, making an appropriation therefor, and repealing an Act herein named" (Ill. Rev. Stat. 1987, ch. 144, par. 188 et seq.).

"Scholar" means the recipient of a scholarship for an eligible program of study leading to the award of a baccalaureate or higher degree.

Section 700.30 Scope of Science Education Scholarship Program

- a) The Science Education Scholarship Program includes scholarships and grants for special study and education projects designed to enhance the study of and body of expertise in those sciences pertaining to nuclear safety and related fields.
- b) Under the scholarship program the Department shall, in accordance with the provisions of this Part, award fully funded college scholarships. The Department's scholarships will pay the scholars for educational expenses associated with attending a public institution of higher education. Expenses paid by the Department shall be limited to tuition and fees, room and board, required books, and miscellaneous expenses (e.g. travel, daily expenses, etc.). Miscellaneous expenses will be limited to \$200 dollars per month. If a scholar chooses to live off campus, the scholarship will provide room and board funds only up to that amount assessed for on campus room and board by the public institution of higher education that the scholar will be attending. If the public institution of higher education that the scholar will be attending does not provide room and board, the Department will provide

room and board funds only up to that amount estimated by the public institution of higher education as being a reasonable estimate for off campus room and board. In the event that no such reasonable estimate is provided to the Department, the Department will determine, by consulting other area institutions of higher education, and provide a reasonable sum per semester towards room and board.

- c) In order to promote greater understanding of the role of the administrative agency in assuring radiation safety, the Director also may offer temporary or part-time employment with the Department to scholars.

Section 700.40 Qualification Criteria

- a) Basic Eligibility Requirements. The applicant must:
 - 1) be an Illinois resident at the time of application; and
 - 2) be accepted by or enrolled in a public institution of higher education as a full-time student, in an eligible program of study. The program or study must have direct application to the fields of endeavor of the Department (e.g. radiation protection, environmental monitoring, health physics).
- b) Academic qualifications:
 - 1) If the applicant is a high school senior, the applicant must:
 - A) be recommended by his or her science department director and high school principal,
 - B) be in the upper 20% academically of his or her graduating class, and
 - C) have displayed an interest in, and acumen for, the physical or biological sciences. This display may take the form, for example, of academic achievement, participation in science fairs, pursuing science courses at community colleges, performing independent extracurricular research, etc.
 - 2) If the applicant is an undergraduate student, the applicant must:
 - A) be enrolled in an eligible program of study,
 - B) be recommended for the award by the dean or chairman of the science department in which the applicant is pursuing an eligible program of study, and
 - C) have an overall academic average of B or better and an overall average of B or better in the science department courses.
 - 3) If the applicant is a graduate student, the applicant must:
 - A) be recommended for the award by the dean or chairman of the science department in which the applicant is pursuing an eligible program of study,
 - B) have or have graduated with an overall academic average of B or better and an overall average of B or better in the science department courses, and
 - C) describe the relevance of his proposed research program to either the statutory duties of the Department or the contribution of the proposed program to the body of knowledge of radiation safety.

- a) The scholar will not change his or her choice of college or program of study without first obtaining the approval of the Director.

- b) If the scholar withdraws from, is dismissed from, or fails to continue to pursue an eligible program of study, the scholarship will be withdrawn and the scholar shall repay the State of Illinois in full for all expenses paid to that date in connection with the scholarship. Repayment shall be in accordance with the provisions of subsection (d).

AGENCY NOTE: A scholar whose permanent residence changes from Illinois to another State, after selection for the scholarship program, will continue to be eligible for continuation in the scholarship program so long as the scholar continues to pursue an eligible program of study at an Illinois institution of higher education and meets the scholastic standards specified in this Part.

- c) If the scholar is an undergraduate student, the scholar must maintain both a cumulative average in all subjects of B and an average of B or better in the science department program of study. If the scholar is a graduate student, he must maintain a cumulative average of B or better. Averages shall be evaluated at the end of each regular grading period of the public institution of higher education. If the scholar fails to maintain these academic standards, the scholarship will be withdrawn and the scholar shall be responsible for repaying the State of Illinois in full for all expenses paid to the scholar in connection with the scholarship up to the date of withdrawal of the scholarship. A scholar who fails to maintain the required average in all subjects or in the eligible program of study, evaluated at the end of each grading period, may submit a letter to the Director requesting to be granted probationary status for one grading period in order to raise his or her grades to the required level. The Director will grant such request if the scholar has shown that the failure to attain the required averages resulted from good cause, e.g., illness, family responsibilities, etc. Failure to attain the required cumulative averages at the end of the probationary period will result in the loss of scholarship and the scholar will be required to repay the State of Illinois in full for all expenses paid in connection with the scholarship to the date of withdrawal of the scholarship. Such repayment shall be in accordance with the provisions of subsection (d).
- d) If the scholar is required to repay the scholarship because the scholarship is withdrawn (see subsection (b)) or because the scholar has failed to maintain the required cumulative grade averages (see subsection (c)) the repayment shall be made in equal monthly installments over a period of ten years at ten percent simple interest. There shall be no early repayment penalty. The first repayment shall be due on a date specified by the Director, which date shall be no earlier than twelve (12) months after the scholar has ceased to be enrolled as a full-time student in a public institution of higher education.
- e) If such employment is offered, scholars that graduate without having the scholarship withdrawn must agree to accept employment, upon graduation, with the Department, the operator of a regional facility for the disposal of low level radioactive waste in Illinois, or a public utility owning or operating a nuclear power plant in Illinois. Mandatory employment shall be for a period of one calendar year for each academic year of scholarship period accepted. Partial academic years shall be prorated. If employment with the Department, the low level radioactive waste disposal facility or a nuclear power utility is not offered at least 30 days prior to graduation, the applicant is under no obligation to accept employment

Section 700.50 Conditions of Award

The applicant must agree in writing to the following conditions:

with the Department, the operator of a regional facility for disposal of low-level radioactive waste, or a public utility or to repay the scholarship expenses. Fulfillment of the employment obligation may be deferred during any period in which the scholar participates in full-time graduate studies leading towards an advanced degree.

- f) If the scholar completes the program but refuses to accept offered employment with the Department, the operator of a regional facility for the disposal of low-level radioactive waste in Illinois, or a public utility owning or operating a nuclear power plant in Illinois, he or she is required to repay the State of Illinois in full for all expenses paid by the Department in connection with the scholarship. If the scholar terminates employment, for any reason other than to pursue full-time graduate studies, or if the scholar has his or her employment terminated for cause prior to completion of the mandatory employment period, he or she is required to repay the State of Illinois in full for all expenses associated with the scholarship, prorated for the unexpired mandatory employment period. If the scholar is required to repay the scholarship under this section, the repayment shall be made in equal monthly installments over a period of two years at ten percent simple interest. There shall be no penalty for early payment. If termination by the employer is other than for cause, the scholar shall be under no obligation to repay the scholarship expenses.

Section 700.60 Scholarship Application and Selection Process

- a) Scholarship applicants may apply for consideration for the award for Department scholarship by submitting an application, on a form provided by the Director of the Department. The application shall include the following information:
- 1) Evidence that the State residency requirements has been met;
 - 2) Evidence of acceptance at or enrollment in a public institution of higher education. Letters of acceptance must be received by the Department before the Selection Board convenes;
 - 3) For high school seniors, transcripts showing the applicant's high school graduating academic average;
 - 4) For high school seniors, written recommendations of the science department director and high school principal;
 - 5) For undergraduate and graduate students, transcripts showing the applicant's cumulative college academic average, and grades in science department courses;
 - 6) For undergraduate and graduate students, written recommendations of the science department chairman and college dean;
 - 7) A statement of the applicant's personal educational goals, including a description of the scope and nature of the proposed program of study;
 - 8) A statement describing the applicant's financial need.
- b) Every applicant (if the applicant is an adult residing outside his or her parents' home) or the parents or legal guardian of every applicant citing financial need is required to submit financial information, which will be kept confidential. All confidential statements must be signed, certifying the parents' willingness to submit an official copy of their federal and state income tax returns, if requested. A statement of financial need must substantiate the applicant's inability to pursue or complete

the eligible course of study due to lack of financial support from all other sources.

- c) The Director will convene and chair a Science Education Scholarship Selection Board to review applications for the scholarship. The Science Education Scholarship Selection Board will consist of the Director, the Managers of the Offices of: Environmental Safety, Administrative Support, Nuclear Facility Safety, and Radiation Safety; Chief Legal Counsel; and the Training/Human Resources Coordinator (non-voting).
- 1) Selection will be based on:
 - A) Applicability of the proposed program of study to nuclear safety objectives, projects, or needs,
 - B) Demonstrated acumen and scientific competence of the applicant,
 - C) Recommendations of school officials, and
 - D) Financial need.
 - 2) If the Board is unable to select a scholarship recipient based solely on the written applications, the Board will require those applicants who are still under consideration after review of the written applications to appear before the Science Education Scholarship Selection Board. The purpose of the appearance would be to better define the applicant's stated educational program objectives and the relevance of these objectives to the Department's statutory duties. Information obtained during the appearances will be used to select among those applicants still under consideration.
 - 3) In awarding scholarships under this Part, *the Director shall give preference to qualified applicants who reside in a county where a regional facility for the disposal of low-level radioactive waste is located as provided in Section 6 of the Act.*
 - 4) In awarding scholarships under this Part, the Director will actively encourage applications from and give due consideration to qualified applicants who are minority persons or females, as defined in Minority and Female Business Enterprise Act (Ill. Rev. Stat. 1987, ch. 127, par. 132.600 et seq.).

Section 700.70 Scholarship Application Procedures

- a) Each applicant must submit:
- 1) an application, as provided in Section 700.60(a), with all written recommendations, transcripts and personal statements, by the announced deadline;
 - 2) his or her social security number; and
 - 3) a description of all additional gifts, grants, financial aid, specifying amounts and restrictions on its use.
- b) Information submitted on or in support of an application is not subject to return to the applicant.
- c) Unless the applicant is requested to appear before the Science Education Scholarship Selection Board, the selection will be based on the submitted documents and statements.
- d) Any change in the applicant's circumstances (e.g. acceptance into the college cited in the application; change in choice of program of study, financial need, etc.) must be submitted by separate letter prior to the convening of the Science Education Scholarship Selection Board. Failure to do so may be cause for disqualification.
- e) Incomplete applications will be placed in a pending status until all information is submitted. It is the responsibility of the applicant to ensure that all information is submitted. Applications not complete when the Science Education Scholarship Selection Board convenes will not be considered.

- f) Acceptance of any monetary award intended to cover all or part of tuition and fees, room and board, books and required materials will reduce the amount of support provided by the Department by an equal amount.

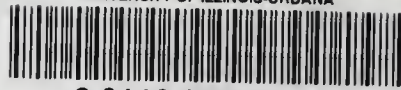
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